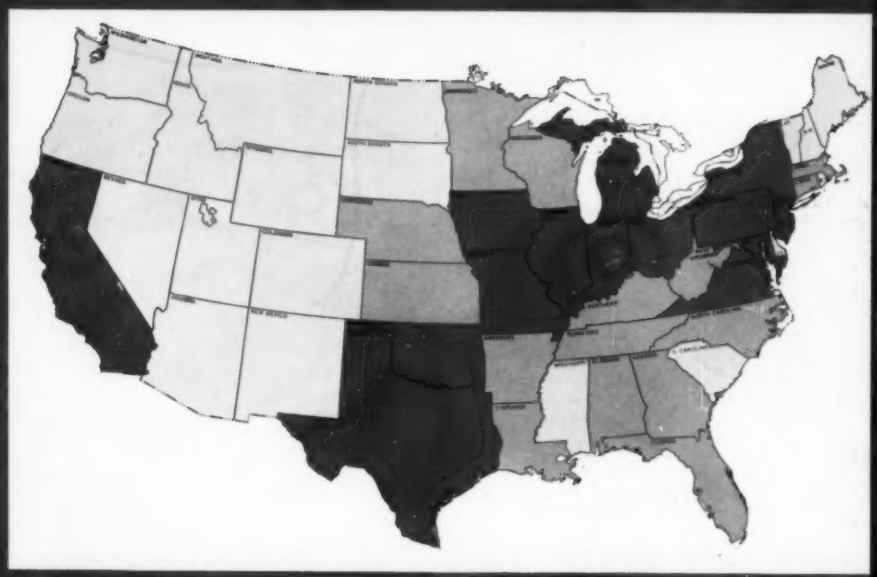
DECEMBER 1954

AMERICAN ARTISAN

WARM AIR HEATING
RESIDENTIAL AIR CONDITIONING
SHEET METAL CONTRACTING



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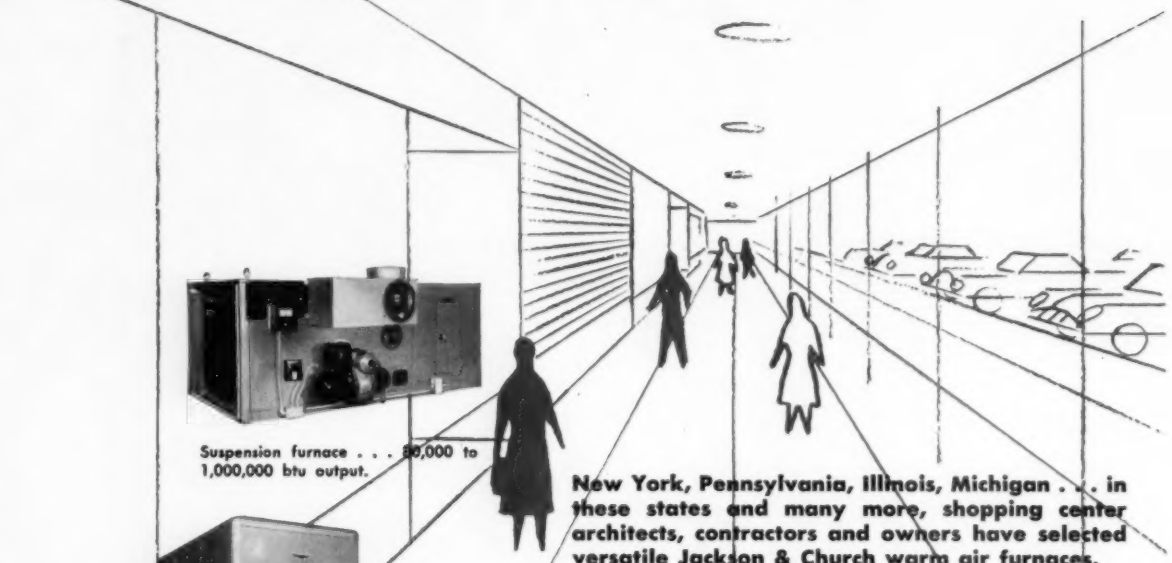
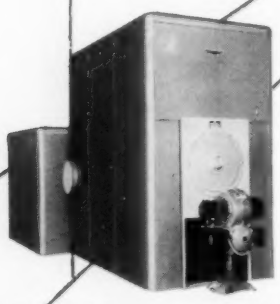
IN SUBURBAN SHOPPING CENTERS . . . the trend is to

JACKSON & CHURCH FURNACES



Suspension furnace . . . 80,000 to 1,000,000 btu output.



Powerated furnace . . . 380,000 to 4,700,000 btu output.

Learn more about "America's Largest and Most Complete Warm Air Heating Line" from the stocking jobber nearest you or write to our factory.

New York, Pennsylvania, Illinois, Michigan . . . in these states and many more, shopping center architects, contractors and owners have selected versatile Jackson & Church warm air furnaces.

BECAUSE THEY'VE FOUND AN INDIVIDUAL CENTRAL HEATING SYSTEM WITH J-C FURNACES:

. . . provides an even distribution of air throughout the shopping area with inconspicuous ducts to take the heat where it is needed. Chilly floors, common with other types of heating, are unknown.

. . . eliminates noisy, unsightly heating units overhead that blast air into the faces of customers and heat only the upper portions of the room.

. . . permits easy addition of cooling units—either during or after installation of the furnace—since ducts and other facilities are basic with warm air systems.

. . . gives as many as seven air changes per hour by blending fresh air with room air (impractical with other types of heating).

. . . is automatically controlled to guard against uncomfortable temperatures during peak traffic loads. Store customers and employees are kept comfortable and satisfied.

J-C

JACKSON & CHURCH CO. SAGINAW, MICHIGAN

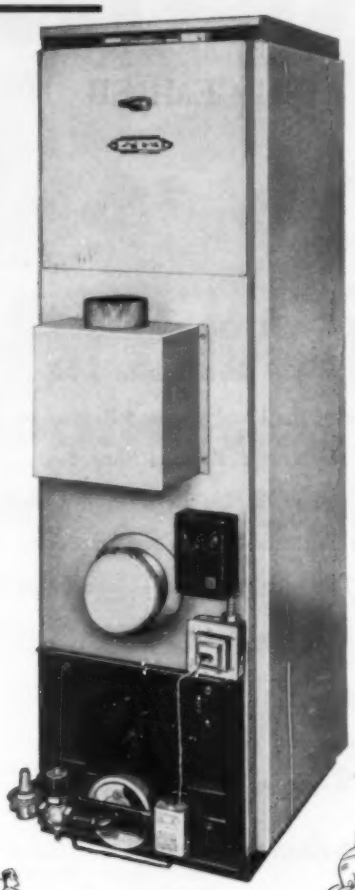
Work well done since eighty-one

these 7 features make KO-Z-AIRE PRODUCTS, INC. a "natural" money maker for you

KO-Z-AIRE dealers find these 7 features make their selling easier year after year . . .

1. Quality construction . . . engineered for years of trouble-free operation
2. Attractive cabinets with baked enamel finish—ideal for any surroundings, easy to keep clean
3. Designed for high heating efficiency
4. Economical operation with either gas or oil
5. Engineered for easy installation—most units shipped completely assembled and wired
6. A size for every home—70,000 BTU to 420,000 BTU input—Ko-Z-Aire's complete gas and oil lines help you close more sales . . . make more money!
7. Easy convertability—most units from oil to gas or gas to oil

PLUS faster, more experienced field assistance and service to Ko-Z-Aire dealers and distributors. For more and faster sales . . . bigger profits . . . line up with Ko-Z-Aire. Why not get all the facts and figures? Start now by mailing the coupon below.

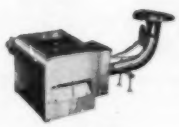


GAS COUNTERFLOW

MAIL COUPON TODAY

MORE THAN 35 MODELS

GAS HI-BOY MODELS



CONVERSION GAS BURNER

LOW-BOY MODELS

- *Counterflow and Hi-Boy Models—Oil 85,000—96,000 BTU Output*
- *Counterflow and Hi-Boy Models—Gas 70,000—90,000 BTU Input*
- *Gas Conversion Burner 70,000—300,000 BTU Input*
- *Lo-Boy Models—Gas 90,000—140,000 BTU Input*
- *Lo-Boy Models—Oil 85,400—123,000 BTU Output. Larger models to 420,000 BTU*
- *Oil Conversion Burner 0.75—12 gallons per hour*
- *Gas Gravity Models—70,000—125,000 BTU Input*

KO-Z-AIRE PRODUCTS, INC.

KO-Z-AIRE Products, Inc., Dept. 06, Red Oak, Iowa

Please send us details on the Ko-Z-Aire Gas Counterflows plus information on the complete Ko-Z-Aire line.

Name .....

Title .....

Firm .....

Address .....

City ..... Zone ..... State .....

AMERICAN ARTISAN

DECEMBER 1954

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Founded 1864

Volume 91 No. 12

WARM AIR HEATING

RESIDENTIAL AIR CONDITIONING

SHEET METAL CONTRACTNG

Merged with American Artisan are "Warm Air Heating" and "Furnaces and Sheet Metals"

EDITOR
CLYDE M. BARNES

ASSOCIATE EDITOR
PHILIP D. WARD

ASSISTANT EDITOR
M. C. WRIGHT

EDITORIAL ASSISTANT
H. C. LENNARTSON

ADVERTISING STAFF

WALLACE J. OSBORN
ROBERT J. OSBORN
New York City
MUrray Hill 9-8293

ROBERT A. JACK
DAVID V. MAHAN
Cleveland
SUperior 1-1291

GEORGE C. CUTLER
THOMAS V. JOHNSON
JAMES E. SACRA
Chicago
STate 2-6916

JAMES D. THOMAS
Tucson
6-3698

R. PAYNE WETTSTEIN
Los Angeles—DUnkirk 8-2286
San Francisco—YUkon 6-2522
Portland—ATwater 4107

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Editorial Director—C. M. BURNAM JR.

Production Manager—L. A. DOYLE

Circulation Director—FRANK S. EASTER

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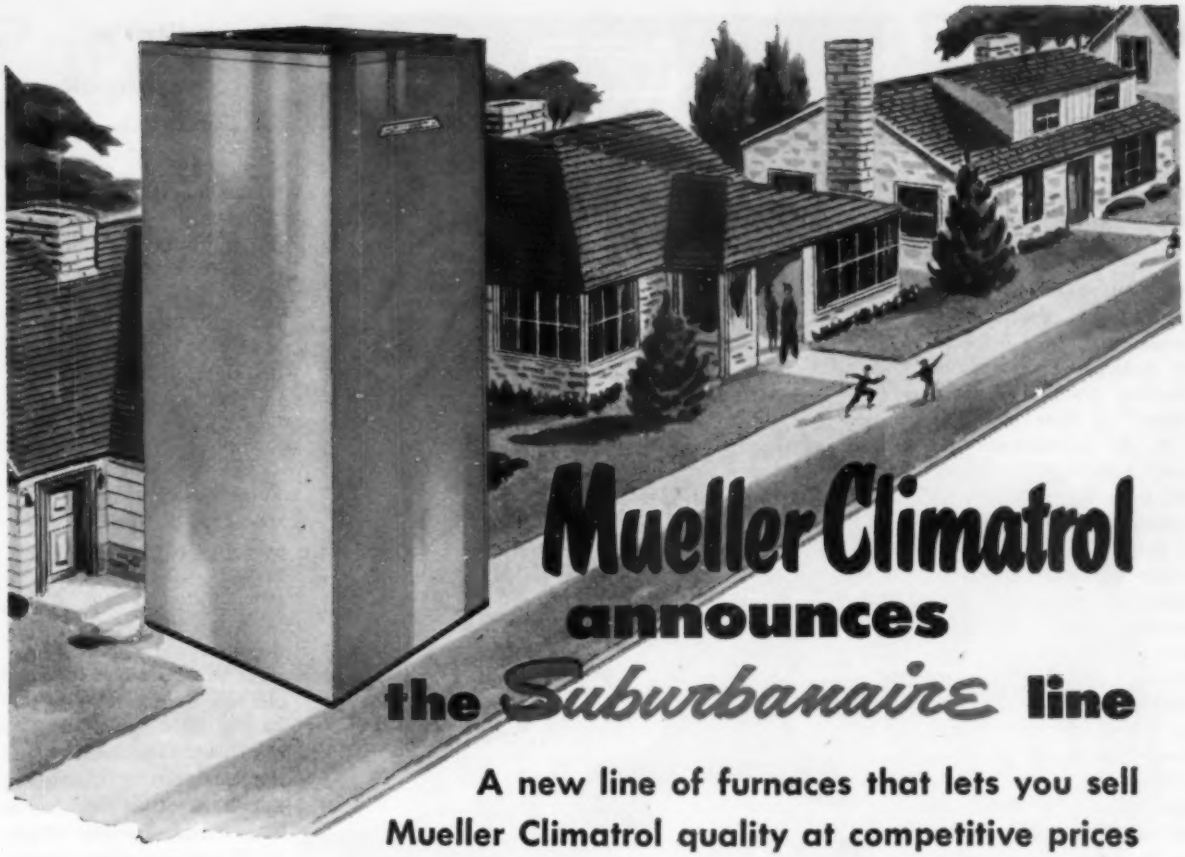


Mueller Climatrol announces the Suburbanaire line

A new line of furnaces that lets you sell Mueller Climatrol quality at competitive prices

Now you can use the strong sales appeal of Mueller Climatrol's famous, nationally advertised brand name to close prospects who buy on price. For, here is a brand new *line*, not to replace the Mueller Climatrol deluxe line, but to supplement it and give you the equipment for the competitive jobs.

And you can sell with confidence that you are offering a lot of value for the money — these seven, new winter air conditioners are quality-built throughout. They are compact, attractive, shipped assembled and pre-wired, easy to install.

Here's the new Suburbanaire line-up:

Type 117 Gas-fired highboy. 80,000 and 100,000 Btu input. Rear location of burner manifold and flue outlet simplifies connection to chimney, minimizes floor space required.

Type 217 Oil-fired — otherwise identical to Type 117 described above. 80,000 and 110,000 Btu input.

Type 118 Gas-fired counter-flow, winter air conditioner. 100,000 Btu input. Compact, attractive. Only 65½" high, 25½" wide. Pre-wired, shipped assembled.

Type 218 Oil-fired — otherwise identical to Type 118 described above. 100,000 Btu input.

Type 119 Gas-fired lowboy winter air conditioner. 90,000 and 110,000 Btu input. For basement installation, compact and attractive.

Type 219 Oil-fired — otherwise identical to Type 119 lowboy for basement installations.

Type 165 (available soon) Gas-fired horizontal winter air conditioner. To be from 60,000 to 120,000 Btu input. For attic, closet, and crawl-space installations.

Think of all the extra sales opportunities this new, competitive Mueller Climatrol Suburbanaire line opens up for you! Get set to cash in on 'em fast — send coupon right now for further information.

97th Anniversary

Tear out this coupon and mail today!

MUELLER CLIMATROL
2030N W. Oklahoma Avenue, Milwaukee 15, Wisconsin
Tell me more about the new, money-making Mueller Climatrol Types 117-217-118-218-119-219-165.

Name_____

Company Name_____

Address_____

City_____ (____) State_____

D-176

the editor's notebook

Thumbing Through This Month's Artisan

. . . we measure year 'round residential air conditioning potential in various sections of the country, analyzing the pertinent question, *Now That the "Boom" is Here — Where Will Air Conditioning Be Sold?* Authors V. T. Kartorie and John R. Hertzler relate climatic factors to the statistical data provided by the 1950 Census of Housing and the American Artisan study, *How America's Homes Are Heated*, noting the sharp increase which took place between 1940 and 1950 in the number of centrally heated single family structures in those states having climatic factors higher than 0.60. They point out that while such states may not be major "mass market" areas, they do suggest immediate sales development opportunities. For air conditioning sales in general, they predict "continued acceleration and increasing public acceptance so long as housing starts are maintained at the high rates experienced during the past several years."

. . . and we do some sleuthing with C. T. Baker in *The Case of the Poorly Heated Parsonage*. Mr. Baker directs a systematic search for sources of heat loss between furnace and attic, suggests safety measures and makes recommendations for improving the heating performance and reducing fuel bills.

. . . and we study the *Techniques for Charging a Refrigerating System* under the guidance of S. W. Reid, who outlines specific procedures and precautions in

in PRODUCING SALES

Sundstrand
All Electric
OIL BURNER

Such integral values as design, construction and performance give the Sundstrand line selling power backed by consumer acceptance.

The public hears about Sundstrand. They see Sundstrand. They buy Sundstrand.

Because: Ultimate heating satisfaction means having an oil burner with

★ *DURABILITY*
★ *DEPENDABILITY*
★ *COMPACT DESIGN*
★ *OVERALL ECONOMY*
★ *QUIET OPERATION*

These salient features result from 32 years of engineering and development by Sundstrand. Available is a complete line of oil burners for new installations or conversion. To increase *your* sales with Sundstrand,

write to —

SUNDSTRAND ENGINEERING CO.
ROCKFORD, ILLINOIS

the editor's notebook

(continued)

evacuating, charging and reclaiming. Preparation, cleaning, measuring, leak locating and proper equipment are clearly discussed in this month's offering in Mr. Reid's enlightening series dealing with residential cooling problems.

. . . we learn *Who Is Responsible For Electric Current Supply* when a dealer sells an air conditioning unit to meet a customer's specific requirement. Author Albert W. Gray cites parallel court decisions and applies provisions of the *Uniform Sales Act* in showing dealer responsibility in supplying equipment or service under an implied warranty of fitness. In his analysis of the dealer's and contractor's relationship to the law, Mr. Gray emphasizes the importance of understanding the exact nature of the customer's expressed needs in order to avoid legal entanglements should his product or service not properly accomplish the purpose for which it is supplied.

. . . and we are shown the procedure for *Developing a Layout for a Tapered Shoe Tee* in Hugh Reid's monthly pattern problem. The shoe tee under discussion was attached to the center of a tapered fitting in the fume exhaust system of a welding shop. The layout takes into consideration storage, location of lifting equipment, protection against welding flash and proper fume and smoke evacuation.

Developing Low Cost Home Conditioner

DONALD C. MINARD, president, The Trane Co., predicts

Engineered for DEPENDABILITY

Delco Motors

Careful dynamic balance is only one reason why Delco motors are preferred by many leading manufacturers of heating and ventilating equipment.

An impressive list of features contributes to Delco's enviable record for continuous, trouble-free performance. These features include uniflow pressure-cast rotor conductors, steel-backed tin babbitt sleeve bearings, cored oil wells, varnish-dipped and baked motor windings. Careful selection of materials, too, is a big factor in enabling Delco motors to give longer, more dependable service.

The motors you need for your products, in sizes from fractional to 100 h.p., are in the great Delco line. For information on motors for any application, address Delco Products, Dayton, Ohio, or our nearest sales office.

MOTORS FOR OIL BURNERS

Delco flange-mounted motors, split-phase—⅙- to ¼-horsepower ratings.

THE BEST RUNNING MATE YOUR PRODUCT CAN HAVE

MOTORS FOR BLOWERS

Delco resilient-mounted motors, split-phase and capacitor-start types, single- and two-speed designs—⅙- to ¾-horsepower ratings.

DELCO PRODUCTS

Division of General Motors Corporation • Dayton, Ohio

SALES OFFICES:

ATLANTA • CHICAGO • CINCINNATI • CLEVELAND • DALLAS
DETROIT • EVANSVILLE • HARTFORD • KANSAS CITY • LOS ANGELES
PHILADELPHIA • ST. LOUIS • SAN FRANCISCO • SYRACUSE

the editor's notebook

(continued)

that in the near future — possibly within the next two or three years — central residential year 'round air conditioners will be available which will sell for "only $350 or so more than a good central home heating plant." His company, he says, is making excellent progress in the development of such a combined cooling-heating unit, which will be no larger than the present home refrigerator and perhaps smaller. "While this compact unit may be the heart of the system," he noted, "the means for distributing the conditioned air are equally important. Our laboratories are working on entirely new methods of introducing the air into the various rooms. At the moment it seems probable that future home air conditioners will deliver the air through plastic ducts only 3 or 4 in. in diameter — ducts that are prefabricated and self-insulating." While the air will rush through the ducts with power enough to blow a whistle so it could be heard miles away, he said, "it should be discharged into the room so silently you never hear it because of a new diffuser grille design with which we are now experimenting."

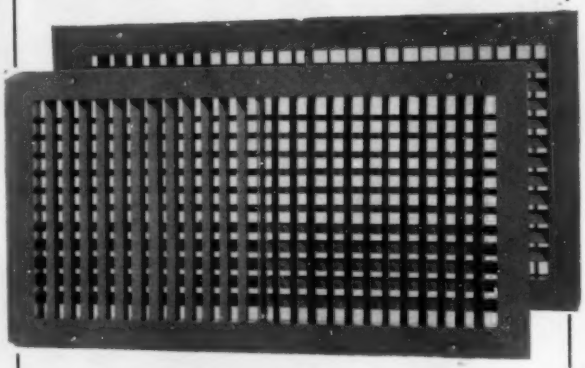
How to Cut Costs by Stabilizing Employment

I WAS much interested in a pamphlet recently issued by the United States Chamber of Commerce entitled *Steadier Jobs,* which outlines specific techniques designed to reduce employment irregularity. The pamphlet points out that self-interest alone justifies employers' efforts to stabilize jobs.

New Heating and Air Conditioning

GRILLE

With Detachable Volume Control



- **Increased Directional Control**
- **Eliminates Possibility of Tampering or Accidental Changes**
- **Meters Air-flow Accurately**

New features never before available . . . increased directional control, tamper-proof regulating, unmatched beauty, rugged strength and extreme ease of installation.

Extruded aluminum vanes are individually adjustable. Their unique shape provides greater directional control, and reduces air resistance to a minimum. This means more accurate balancing.

Each vane individually controlled. Operates under spring-loaded tension, eliminating any possibility of deflection pattern being altered by accident or tampering.

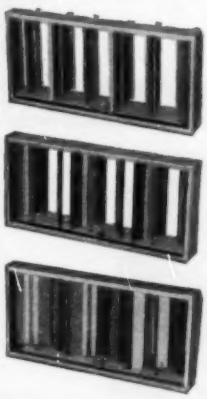
Fully-enclosed, wrap-around frame makes grille sturdier, assures easier, safer installation. Entire mechanism is concealed eliminating possibility of "air leaks".

Series "400" A-J Grilles (with — or without volume control) available in any size. Choice of vertical or horizontal louvers only — or combination of both, with either louver in front. Both sets of louvers adjustable without removing grille. Available in prime coat, hammered bronze or metallic gray or any standard finish.

MATCHING RETURN AIR GRILLES AVAILABLE

NEW Detachable Volume Control

Easy to operate. Accurately meters air-flow from a "Whisper" to a "Full Blast"! A volume control you can depend on! Meters the flow accurately at every stage — from fully closed to fully open. No "dead spots". Louvers move simultaneously in opposing directions. Gear-driven action. System may be balanced without removing outer grille. Available with grille, or can be quickly installed later.



For More Information — Call or Write

A-J MANUFACTURING CO.

2119 Washington St. Dept. A-12 Kansas City 8, Mo.

the editor's notebook

(continued)

"Irregular employment," it says, "is costly to the employer because it means greater investment costs, higher labor turnover, higher training outlays and more spoilage and wear and tear on machines and equipment. It means that during slack periods plant and equipment are under-utilized."

One of the pamphlet's features is a questionnaire which will help the employer assess his firm's job stabilization policy and suggest ways of improving the policy. Included are steps for the establishment of a steadier jobs program.

Says Copper In Ample Supply

GEORGE W. PROFFITT, executive secretary of the Copper and Brass Warehouse Association, Inc. writes me that the rumors of copper shortages which have led some industrial users to search for substitutes are completely unfounded. The metal is in ample supply, he says, and copper production during the next year or two will be increasing by nearly one fourth.

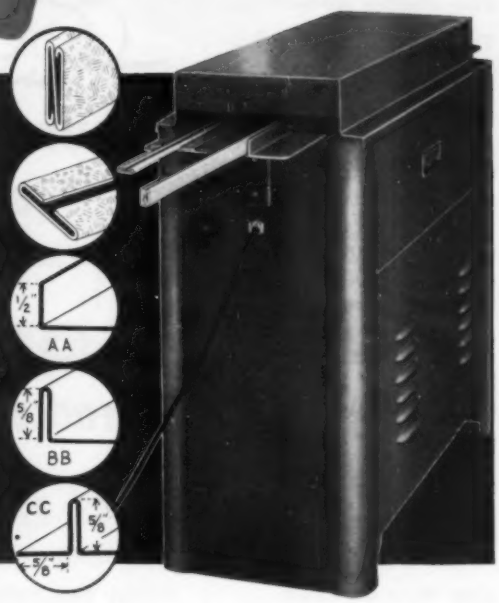
Looking for Metal Business Cards

ORVAL HANSON wants to know where he can obtain sheet metal business cards such as those mentioned in the article, *35 Ways to Increase Sheet Metal Sales.* "This sounds like a good idea to me," he writes. "Can you give me the name of some firm that makes metal cards of this type?"

We refer Mr. Hanson — and any other interested readers — to the Green Duck Co., 1520 W. Montana, Chicago, who make

are you STILL making cleats by hand?

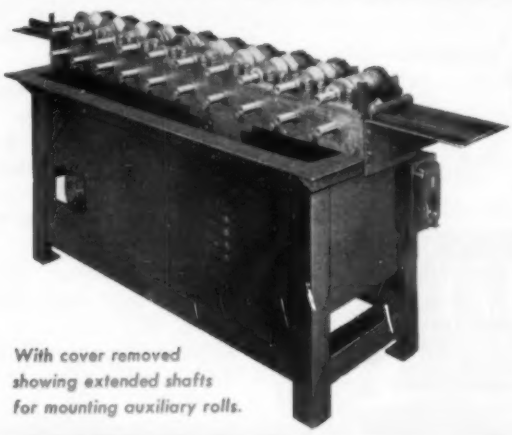
here's the low-cost easy way!



THE CLEATFORMER

The double hem "S" cleat shown at the right is many times as strong as the conventional "S"—gives you a stronger, stiffer cleat from lighter gauge metal, permits the use of longer cleats, and can be used as a snap lock. Installed, it exactly matches the drive cleat and makes a neat, professional looking assembly. Drive cleats, T connections, standing seams and right angle flanges are all made with auxiliary rolls mounting on extended shafts.

THE STANDING "S" MACHINE



With cover removed showing extended shafts for mounting auxiliary rolls.

Rolls a combination "S" cleat and standing seam in one pass through the machine. An ideal cleat where extreme strength and rigidity is necessary such as in fabricating large trunk or branch lines in industrial heating and ventilating units. A real "special order" piece of equipment at stock model prices. Extended shafts provided for mounting auxiliary rolls for other special forming operations.

THE LOCKFORMER CO.

4615 WEST ROOSEVELT ROAD • CHICAGO 50, ILLINOIS

the editor's notebook

(continued)

metal specialty items including business cards. Plastic cards can be obtained from J. B. Carroll Co., 319 S. Albany, Chicago.

Cites Advantages of Cooperative Advertising

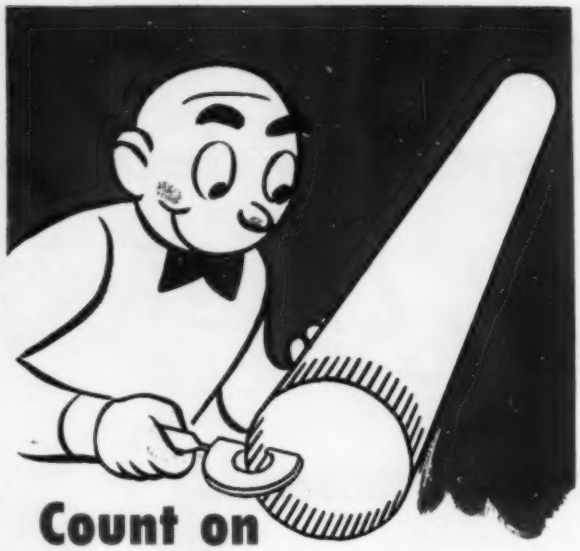
THE OCTOBER issue of *Timken Silent Automatic Heat News* contained an interesting article on the value of cooperative advertising by manufacturer, distributor and dealer. Advantages of using mats prepared by a manufacturer, the article says, include 1) use of professionally prepared advertising copy; 2) relatively low cost for maximum space; 3) flexibility through use of local case history and local event tie-in advertising; 4) reimbursement from funds in cooperative advertising accounts; and 5) assistance by the newspaper's staff.

Ship More Oil Fired Heating Equipment

OIL-HEAT INSTITUTE of America, Inc. reports that shipments of domestic oil burners and oil fired furnaces and boilers in September of this year were 3.4 percent ahead of September 1953. Total shipments in the three categories totalled 99,782 units in September.

How Machine Raises Standard of Living

A BOOKLET recently sent me — *What Machinery Is Doing to Civilization* — tells how machinery creates jobs, opportunities and a better standard of living. "Machines do not make people obsolete," the booklet says, and proceeds to prove the point by citing the hypothetical case



Count on easier, quicker INSTALLATIONS with OHIO VALLEY Furnace Pipe and Fittings

When heating systems are being installed or remodeled — precision-made, standardized Ohio Valley pipe and fittings will make more money for you. They save time — and that means extra profit.

CARRIED IN STOCK BY LEADING WHOLESALERS

Write for our Catalog.

OHIO VALLEY HARDWARE CO., Inc.
MANUFACTURING DIVISION, EVANSVILLE, IND.

the editor's notebook

(continued)

of an inventor who invents 1) a gadget; 2) a machine to produce the gadget; and 3) a machine to make the machines that make the gadgets. Thus, it is explained, an industry is created, providing first employment, then — as manufacturing processes are improved — lower prices resulting in greater demand, and, finally, more employment and a higher standard of living throughout the entire community.

Says Artisan Does "Excellent Job"

IT'S ALWAYS a pleasure to receive letters like one from Bob Welter of Wayzata, Minn., who recently sent in his renewal subscription. "American Artisan does an excellent job," he writes. "Here's my remittance for another three years. Keep those issues coming!"

Servicing for Hermetic Cooling Circuits

CHARLES LARSON, JR., writes from Yankton, S. D. requesting the names of companies which specialize in reconditioning hermetic cooling circuits.

The following companies offer this type of service:

Advance Hermetic Rebuilders, 829 E. McNichols Rd., Detroit, Mich.

Harry Alter Co., 1728 S. Michigan, Chicago, Ill.

Authorized Service Co., 4255 Milwaukee Ave., Chicago 41, Ill.

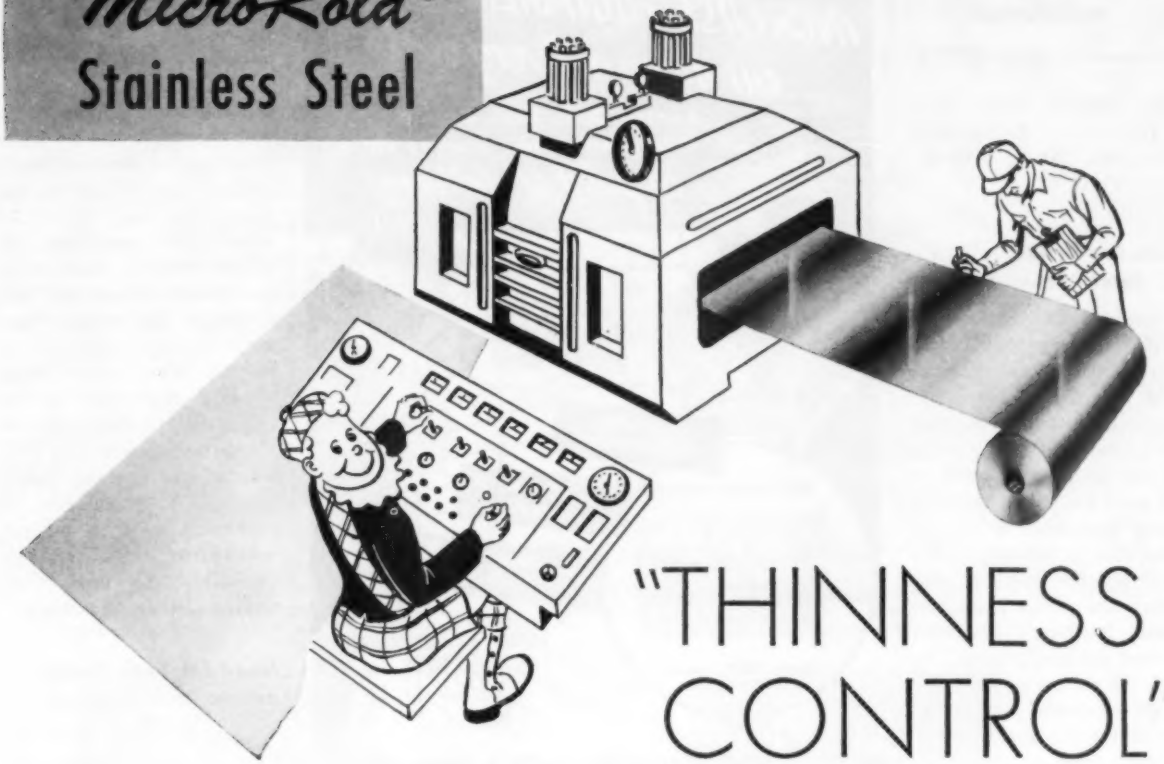
Barger Refrigeration Service Co., 7144 Vincennes, Chicago, Ill.

Brighton Hermetic Service, 3906 Joy Rd., Detroit 6, Mich.

Penguin Products, 15440 Plainview, Detroit 23, Mich.

Service Parts Co., 2511

MicroRold® Stainless Steel



"THINNESS CONTROL"

provides strip *Quality* in SHEET *Sizes*

Remarkable uniformity of gauge in MicroRold Stainless Sheets up to 36″ wide.

The "Thinness Control" used in the manufacture of light gauge MicroRold Stainless Sheets assures you of the *same* dimensional accuracy as in strip stainless. Specified gauge thicknesses may be rolled in sheet sizes with tolerances as low as 3% average (plus or minus) as compared to the A.I.S.I. allowable of plus or minus 10%. This results not only in weight savings but also in fabricating economies.

With "Thinness Control" MicroRold's close adherence to a specified gauge will naturally result in a longer die life. Not only is MicroRold held closely to the specified thickness, but the "crown", or extra thickness in the center, is less in MicroRold than the "crown" in sheets rolled by conventional practice.

Regular use of MicroRold Sheet can give you more stainless area per ton or the equivalent area with lesser weight.

MicroRold Stainless Steel Sheets are available up to 36" wide and in gauges from .005 in commercial grades, finishes and temper.

Ask your steel warehouse distributor for MicroRold with "Thinness Control"

Washington Steel *Corporation*

Washington, Pennsylvania

the editor's notebook

(continued)

Lake, Melrose Park, Ill.

Technical Refrigeration Specialists, 261 E. 161st St., New York 51, N. Y.

Calls for Better AC Sales Techniques

I WAS interested in the remarks made by Matt Lawler at a recent dealer conference held by the Worthington Corp. at Birmingham, Ala. Mr. Lawler, vice president of the company, pointed to the need for better merchandising techniques in the air conditioning industry. "We must sell the idea of comfort, health, better living and better working conditions through air conditioning," he said. "If we can sell the user on these benefits, plus the dependability and quality of the product, then we are establishing a sound relationship with the user — a solid foundation for strengthening the industry." He was optimistic about future prospects, stating that the next few years would see "continued growth and profit possibilities for the air conditioning industry."

Likes Artisan October Cover Picture, But . . .

A RECENT note from Jerald D. Jensen of the Whitney Metal Tool Co. calls our attention to an apparent error in the cover of our October issue. "Seems to me the salesman in the picture might have removed his hat while talking to the lady," he comments.

We of course agree with Mr. Jensen that under ordinary circumstances a salesman should remove his hat when talking to a lady; however, we felt that since the scene illustrated took place in a basement, the salesman's action was quite justified. We

INCREASE EQUIPMENT SALES
...cut down delivery costs
Sentry ODF* Tank Gauge tells drivers what they want to know at point of delivery!
"THAT LITTLE SENTRY GAUGE SURE SAVES US BOTH A LOT OF TROUBLE!"
TELLS WHEN OIL IS NEEDED
*Oil Dealer's Friend
. . . HOW MUCH IS NEEDED
. . . WHEN TO STOP FILLING
STOP FILLING
Sentry "ODF" remote reading gauge
ONLY Sentry OFFERS SUCH A COMPLETE LINE OF DIRECT AND REMOTE READING TANK GAUGES
Above is SENTRY'S newest — The ODF At-A-Glance tank gauge that's setting new records in building sales and customer goodwill. Located outside of building at fill pipe, this easy-to-read weather-proof gauge shows the exact oil level in the indoor tank. Saves costly time consuming trips to basement, unnecessary hose unreeling and eliminates over-flow. Permits delivery without disturbing customer.
Other constant-register SENTRY gauges include combination tank and remote reading, barrel gauges, direct reading, and gauges for stove and space heater tank. Write today for full information about these fast moving business getters. Advertising aids available.
Combination At-A-Glance tank and remote reading gauges
Sentry stove and space heater gauges
Sentry At-A-Glance barrel gauges
On guard— 24 hours a day
Sentry At-A-Glance tank gauge
Sentry superior quality Therma-Gauge
KRUEGER Sentry GAUGES
GREEN BAY • WISCONSIN

the editor's notebook

(continued)

did note this point, though, and checked with the dealer who supplied the photograph, asking if he, too felt that the illustration was typical of actual field conditions. He agreed with us, commenting as follows: "There just isn't a spot in the average basement where a man can set his hat down without being afraid it might pick up dirt or grease, and that's why we allow our salesmen a little leeway under these conditions. As a general rule, of course, we expect all our representatives to be right on the ball when it comes to observing details of courtesy."

Need for Both Group and Individual Effort

"IDEAS are still the basic raw materials of progress and America's future, both in science and national development," writes Crawford H. Greenewalt, president, E. I. duPont de Nemours and Co., Inc. Mr. Greenewalt points out that while modern industry makes group effort a necessity, the fact remains that progress originates in creative thought — a purely personal attribute. Our problem, as he sees it, is that our economy requires group effort to perform its increasingly complex tasks, but it also requires individual genius and accomplishment if we are to go on to greater achievement. Thus, he concludes, the task facing the administrator grows increasingly difficult since it is his function not only to create group harmony but at the same time to encourage high individual performance.

Clyde M. Barnes

EDITOR

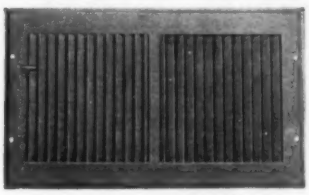
Yes sir . . . right down the line there's more profit for me in

MIDCO

You bet I go for the Midco line. I've learned from experience that Midco registers, grilles and floor faces outperform and out-sell all others. What's more, better-looking Midco registers are priced no higher.

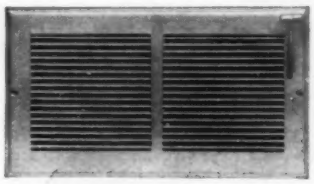
NO. 900

Baseboard Balanced-Flow Perimeter Diffuser. Beautifully designed in clean, simple lines — easy to install.



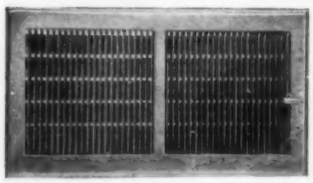
NO. 305

½" vertical fin sidewall multiple louver register for commercial air conditioning.



NO. 20

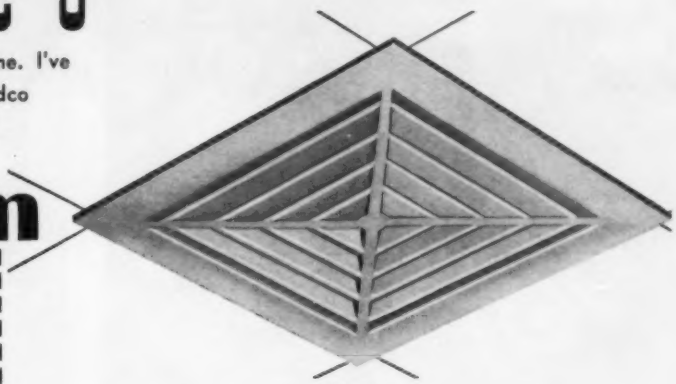
Horizontal fin sidewall register



NO. 30

¼" vertical fin sidewall register

m I D C O

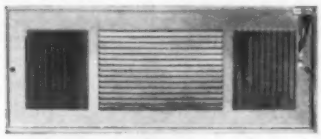


NO. 100

Ceiling Diffuser with damper

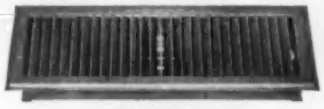
NO. 101

Ceiling Diffuser grille only — Smart, modern square design with remarkable new effectiveness. Blades adjustable to eliminate drafts. Available in 6" - 8" - 10" - 12" and 14" sizes.



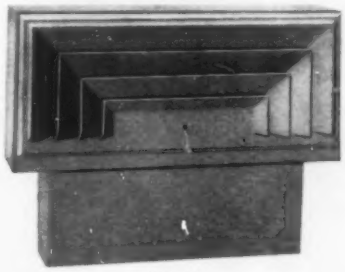
NO. 80

Perimeter sidewall diffuser. Newest and most attractive perimeter sidewall aspirating unit yet designed.



NO. 512

Perimeter floor register



NO. 99

Out-of-wall or in-the-wall perimeter register

Some jobber outlets are still open
Write today for the full Midco story

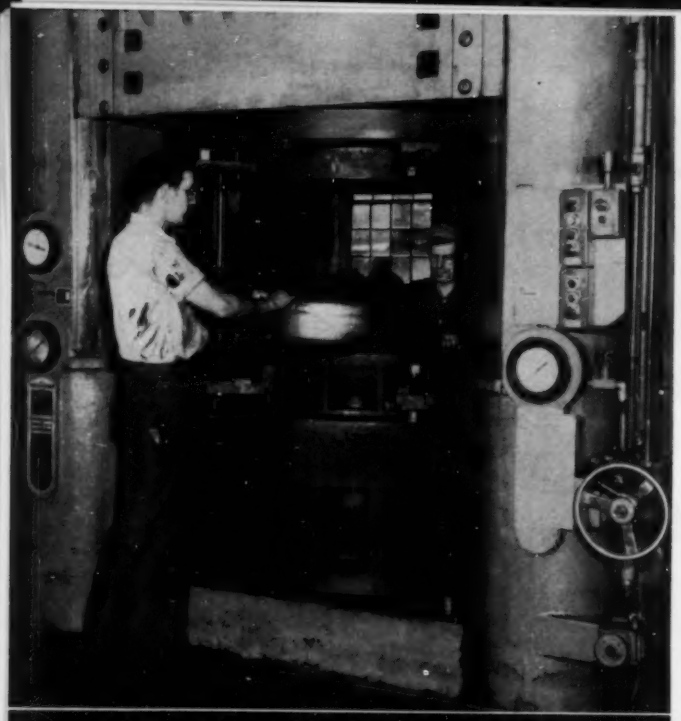
GET IT FROM YOUR JOBBER

Once you investigate the complete Midco Line, you'll agree — Midco quality leads the field. Midco gives you performance you can count on, beauty you can be proud of, and a sound margin of profit for a competitively priced product.

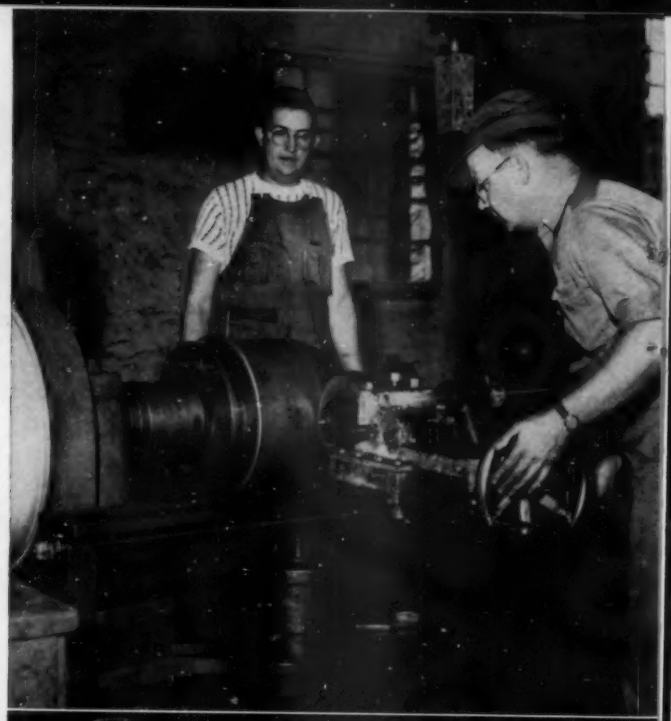
MIDCO

REGISTER CORPORATION

1059 GRAND AVENUE • ST. PAUL 5, MINNESOTA

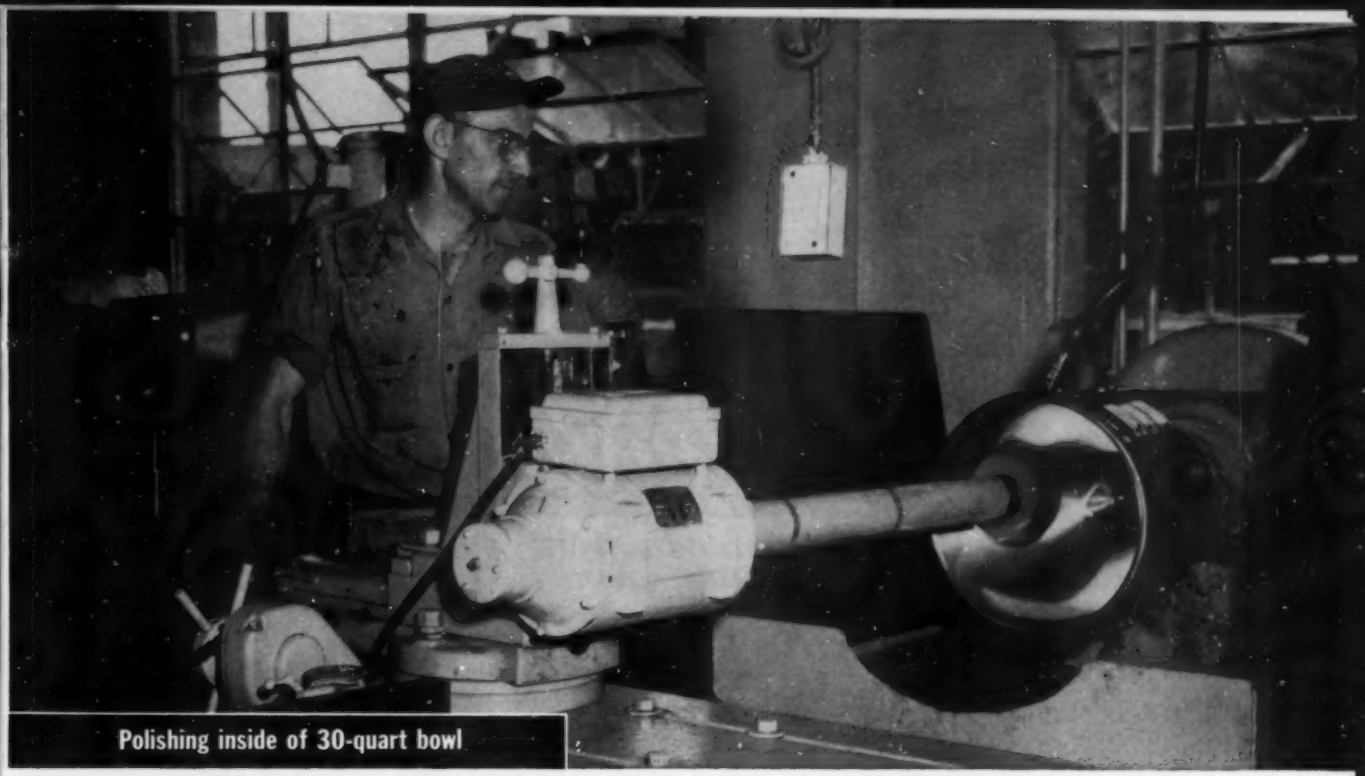


Drawing 30-quart bowl on hydraulic press



Spinning 30-quart bowl on lathe

140-quart bowls ready for shipment



Polishing inside of 30-quart bowl

How A.C.F. Industries fabricates mixing bowls from Stainless Steel

Same equipment at Milton, Pa., plant used for both carbon steel and Stainless

● Here's more proof that a plant using modern equipment and up-to-date shop practices can handle Stainless Steel in its stride.

A.C.F. Industries fabricates a line of industrial mixing bowls—from 12 to 160 quart capacity—at its Milton, Pa., plant. Depending upon service conditions, the bowls are carbon steel or Stainless Steel, but the same shop equipment is used for both.

Homer F. Folk, superintendent of the pressed steel department, points out that the only difference in fabricating methods is the little extra care taken to prevent marring the gleaming surface of Stainless Steel. Otherwise, the steps are the same; there are no special set-ups for handling Stainless Steel.

It's been proved again and again in many shops that "Stainless Steel is not difficult to fabricate—it's just a little different." And United States Steel's representatives will help you minimize this difference by recommending the right grade of Stainless and the most efficient fabricating methods.

FABRICATING OPERATIONS . . . for 30-quart bowl

DRAWING—Done in two operations on a 1000-ton hydraulic press. First draw reduces the 31½-inch circle of 16-gauge Stainless to 20 inches. The final draw makes the diameter 14½ inches and the height of the bowl 15 inches.

ANNEALING AND PICKLING—Only nickel-bearing grade is pickled.

TRIMMING—Bowl flange is trimmed.

SPINNING—Bowl is spun and beaded on lathe.

POLISHING—Exterior of bowl is given rough polishing and then finish.

ASSEMBLY—Handles and other fittings specified by customer are spot and arc welded.

POLISHING—Interior of the bowl is polished as the final step in fabrication.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

USS

SHEETS • STRIP • PLATES • BARS • BILLETS
PIPE • TUBES • WIRE • SPECIAL SECTIONS

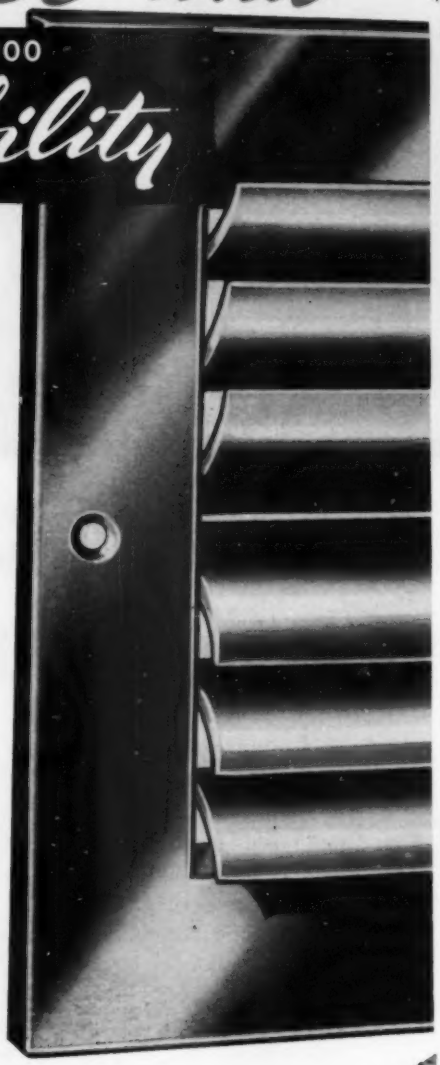
4-2229

UNITED STATES STEEL

New Sidewall and

• REVOLUTIONARY ALL NEW SERIES 200

with 100% Adjustability



- **HANDLES SUMMER AIR CONDITIONING OR WINTER HEATING AIR PATTERNS WITH EQUAL EFFICIENCY**
- **POSITIVE SHUTOFF**
- **AMAZING NEW SOLID SECTION LOUVER DESIGN CURVED FOR SUPER AIR CONTROL**

Another Titus first. A high sidewall and ceiling grille test proven to handle the complex demands of modern heating and cooling. Stamped register designs simply cannot compete. *Grille is so efficient it makes any forced air heating or cooling system perform with superior efficiency.*

Don't jeopardize the performance of your heating or cooling installation with unflexible stamped registers. Install Titus high sidewall and ceiling grilles.

5 IMPORTANT APPLICATIONS

(1) FOR OVERHEAD FORCED AIR SYSTEMS (2) FOR HIGH SIDEWALL INSTALLATIONS (3) FOR REPLACEMENT OF OUTMODED WARM AIR REGISTERS WHEN COOLING IS ADDED (4) FOR REPLACEMENT OF INEFFICIENT OUTLETS IN PROBLEM AREAS TO CORRECT CHILLING OR UNCOMFORTABLE DRAFTS (5) FOR BRINGING IN OVERHEAD AIR CONDITIONING WHERE STEAM OR HOT WATER ARE PRESENTLY USED.

Underbid your competitors with these new 200 series grilles. Give customers quality that cannot be duplicated; air performance that is absolutely superior. Add to your immediate profit picture. Write for complete details now.

REVOLUTIONARY AIR DIRECTING PERFORMANCE ALMOST ELIMINATES DUCT COST IN OVERHEAD SYSTEMS

designed by **TITUS** *Inc.*

Ceiling Grille

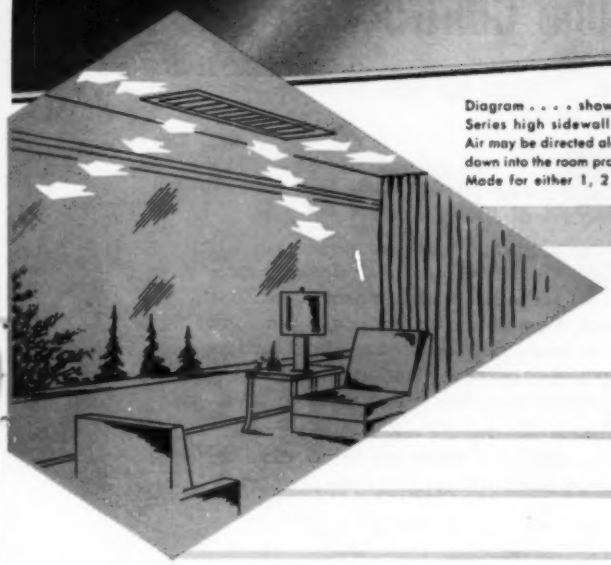


Diagram . . . . shows flexibility of 200 Series high sidewall and ceiling grille. Air may be directed along ceiling or forced down into the room proper at angle desired. Made for either 1, 2 or 4-way diffusion.

FREE CATALOG

CLIP and MAIL COUPON TODAY!

TITUS, INC., WATERLOO, IOWA

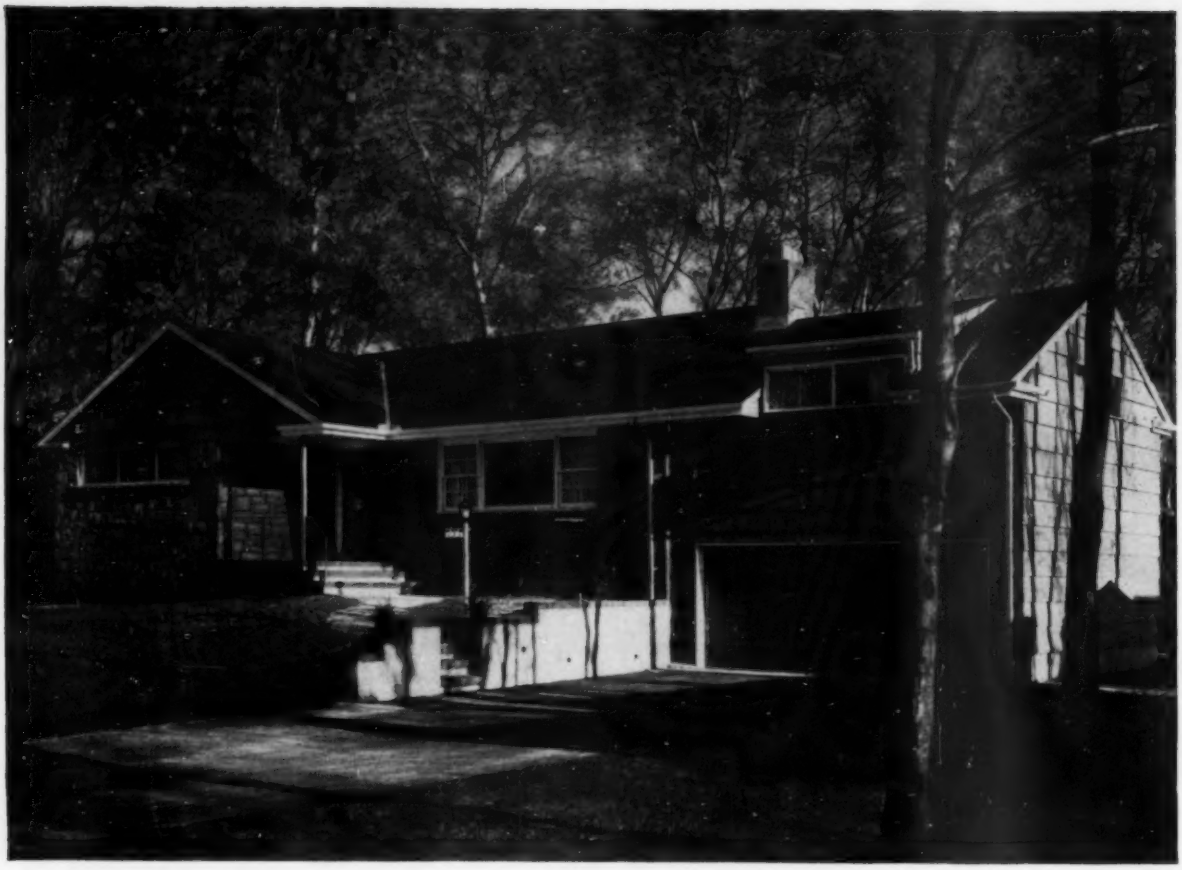
Gentlemen: Please rush me complete new catalog, price lists and discounts on the new 200 Series Sidewall-Ceiling Grille.

Name _____

Company _____

Address _____

City _____ State _____



"Naturally I put the best in my own home – Honeywell Zone Control"

– says heating dealer Michael Buyukas of Glen Rock, New Jersey

"I've planned all kinds of different heating jobs –for all types of houses. That's why I got such a kick out of planning the heating in my own new home!

"Naturally, I wanted the best for my own place. So I installed Honeywell Zone Control. Now I can be sure of comfortable, *even* warmth *in every part of the house* . . . all winter long.

"Our firm has built a reputation for *quality* heating installations here in Glen Rock. One of the reasons for this is that we choose our equipment very carefully. And we stick with equipment that always gives us dependable results– like Honeywell Zone Control.

"Zone Control's flexibility makes it easily adaptable for different family living habits. Once we got to know all the potential for Zone Control, we were set for *any* home. We don't have to worry now about conditions such as wind, sun, exposure, glass, zero weather, or other factors that affect temperature.

"Zone Control is the real answer to modern heating comfort. I know my family and I are certainly pleased with our *comfortable* new home!"

Floor plan showing zoning of the Buyukas residence in Glen Rock, New Jersey. Architect: Laurence R. Moon, Englewood, New Jersey.

"Honeywell Zone Control fits our plans perfectly!"

says Michael Buyukas . . .

"We wanted our house divided in a special way. We wanted one area for living-dining, service and sleeping. Then we wanted a family room as another area where we could all relax together. We worked out plans with our architect so that our family room went over the garage.

"Zone Control was the natural answer for real comfort in each of these areas. So we laid them out as two zones—each with a separate thermostat system.

"The thermostat which serves the living area above (Zone 1) gives us wonderful comfort. It easily handles east, west and north exposure problems created by cold winds. In winter, these are quite different from the family room which faces south.

"The separate thermostat in the family room (Zone 2) compensates for solar heat that often gives extra warmth to the south side of the house. And when the family room is not in use, the thermostat can be set back to save fuel.

"Honeywell Zone Control is a terrific sales story in itself, and it's certainly paid off handsomely for me —*in my own home*—and in my customers' homes, too!"

Honeywell has controls like these for any type Zone Control job

Electronic Chronotherm—famous, fully automatic clock thermostat. Provides night shut-down, automatic morning pick-up for 24-hour control.

Electronic Weathercaster—located outside the house. It senses changes in the weather, and signals the electronic system indoors, automatically.

Modutrol Motor—gives fast, accurate control of dampers and valve assemblies, gives many years of trouble-free service.

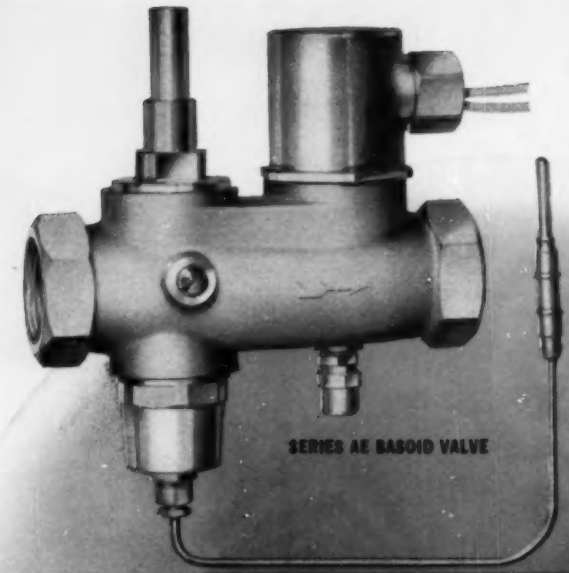
For complete information and application data on Honeywell Zone Control, call the Honeywell office nearest you. Or . . . write Honeywell, Dept. 4A-12-104 Minneapolis 8, Minnesota.

MINNEAPOLIS **Honeywell**

112 OFFICES ACROSS THE NATION

H HONEYWELL

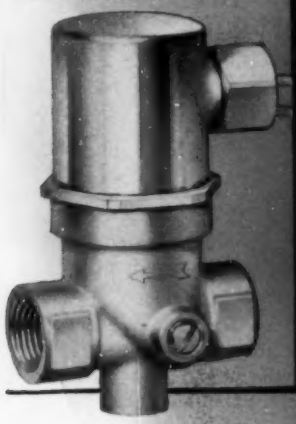
First in Controls



SERIES AE BASOID VALVE

850 BASO SWITCH

SERIES EA SOLENOID VALVE



CONTROLS FOR AUTOMATIC GAS FIRING

ACTROL VALVE MASGI

Look at this line up of controls for automatic operation of your gas appliances.

The Actrol® valve, quiet, stronger to open against gas pressure, with built-in transformer—

The Basoid® valve, space-saving and self-sufficient because it combines in one body a solenoid valve and the Baso automatic pilot, standard of an industry—

The MGSCo Solenoid valve with stainless steel and aluminum parts to resist corrosion of sour gas—

The No. 850 Baso® automatic pilot switch which monitors the operation of the Actrol, Basoid, and Solenoid valves—

In these you can find the combination best suited to give you the years of reliable, service-free operation you want for any type of automatic gas appliances. There's lots more to this story. Drop a card to us; we'll see that you get it.

MILWAUKEE GAS SPECIALTY CO.
Dept. SA-3
MILWAUKEE 1, WISCONSIN

Plan Curriculum for Indoor Comfort Schools

PLANS FOR the 1955 Indoor Comfort schools (two-day heating and cooling conferences sponsored by the National Warm Air Heating and Air Conditioning Association) are well underway. Particular emphasis will be placed on the subject of summer cooling, with discussions scheduled to cover heat gain calculations, the problem of condensation on slabs and in crawl spaces and the transmission of operational noise from the equipment. Also discussed will be 4, 5 and 6 in. round duct heating systems and the designing of these systems so they will be adequate in the event that summer cooling is added later. Additional information and advance registration cards can be obtained by writing to the Indoor Comfort Conference in your area. Tuition fees will be $17.50 per student. Schools scheduled for January are as follows:

January 13-14 — Evansville, Ind. B. J. Kneer, Chairman, 300 Fourth Ave., Evansville 2, Ind.

January 17-18 — Nashville, Tenn. R. L. Farrar, Chairman, 1720 West End Ave., Nashville 4, Tenn.

January 27-28 — Detroit, Mich. E. Simmons, Chairman, 14286 Meyers Rd., Detroit 27.

January 31-February 1 — Kalamazoo, Mich. G. W. Rynbrand, Chairman, 2107 Schippers Lane, Kalamazoo, Mich.

Tin Supply Sufficient To Meet U. S. Needs

MANY PEOPLE expected a shortage of tin to follow the fall of Indo-China, but, as the Malayan Tin Bureau points out in a recent issue of *Tin News*, far less tin is produced by Indo-China than by other countries of southeastern Asia, specifically Malaya, Indonesia and Thailand.

"Southeast Asia will continue to produce tin as long as the United States needs it," the bureau states.

Says Today's Construction "Only Two Thirds of a Boom"

"THE NATION'S construction industry has plenty of room to go on expanding next year and afterward because today's record-breaking dollar volume of construction activity is still well below the proportions of a speculative boom," Dr. George Cline Smith, economist for F. W. Dodge Corp., recently told members of the Chicago Building Congress.

Comparing today's situation with what he said was generally agreed to be a real construction boom in the 1920's, Dr. Smith pointed out that when increases in construction costs and growth of the nation are taken into account, today's volume of construction is proportionately well below the peaks reached in 1926 and 1927. "We can gage the size of present construction outlays in still another way," he said. "In the boom years 1927-29, construction expenditures accounted for more than 15 percent of the total national output; for the past three so-called record-breaking years they have averaged less than 10 percent. On this basis, we have only two thirds of a boom."

Addressing a gathering of architects at the University of Illinois, Dr. Smith pointed out that contract awards for construction of new churches and other religious buildings are setting new high records this year and that the outlook is for even greater activity in the field next year. He predicted the 1954 total would set a new high yearly record, above the $384 million total for 1953.

The October total of Dodge reports of contract awards for future construction in the 37 states east of the Rockies was the third highest monthly total in the company's history. It set the highest ever achieved in the residential classification. Total construction figure for the month was $1,965,339,000 — up 8 percent over September and 4 percent above October 1953. The residential total for the month was $851,824,000 — up 10 percent over September and 34 percent above October 1953. The 10 month total — a new high for any first 10 months — was $16,442,520,000. This was up 11 percent over the corresponding 10 months of 1953.

January Issue Will Include Special Sections

AMERICAN ARTISAN'S DIRECTORY of Warm Air Heating, Residential Air Conditioning and Sheet Metal Products — completely revised and brought up-to-date — will appear in the January issue along with a Show Section devoted to the International Heating, Vertilating & Air Conditioning Exposition, to be held in Philadelphia, January 24-28. Exhibits will be listed and other details of the show and of the annual meeting of the American Society of Heating and Ventilating Engineers will be given in this special Show Section.

The January issue will of course carry its regular quota of editorial content in addition to the Directory and Show Sections.

1954 Volume Index To Be Available

AN INDEX FOR American Artisan's 1954 issues, Vol. 91, Nos. 1-12, is being compiled and will be available soon to the Artisan's subscribers on request. If you want a free copy, send a note or postcard to the Editor, American Artisan, 6 N. Michigan Ave., Chicago 2.

We'll keep your request on file until the index has been printed, and will then mail a copy to you.

(Continued from page 21)

Analyzes Chief Causes of Business Failures as Poor Management

"BUSINESS FAILURES are human failures," concludes Dun & Bradstreet in analyzing the causes of 8862 commercial failures during 1953. The report points out that more than 50 percent of the failures were due to a lack of managerial ability. Lack of experience brought the number of failures caused by the human factor to 89.4 percent of the total.

The principal evidence of human weakness in management is found under the heading of "Inadequate Sales," which varies from 55.5 percent for commercial services to 52.7 percent for manufacturers, 48.8 percent for wholesalers and 52.4 percent for retailers down to 29.7 percent in the construction field.

The Pacific Coast had the highest failure rate, according to the report, with an average of 86.9 failures per 10,000 operating concerns. Middle Atlantic states were second, with 58.6 failures per 10,000. West North Central states were lowest, with 10.4 failures per 10,000 concerns.

The first five years are the hardest, according to the analysis. Nearly half of the firms starting in business drop by the wayside in the second, third and fourth years of operation, or a total of 58.5 percent in the first five years.

The report also shows that business in general is holding its own on a long-term statistical base. In the 53-year record of failures per 10,000 concerns, the peak was 154 in 1932, and the low ebb was four in 1945, when the shortage of materials insured a fast turnover of inventory for profit. The 1953 rate was 33 as compared to 29 in 1952.

More Fee Appraisers For Housing Program

THE FEDERAL HOUSING Administration is now using fee appraisers engaged in private business in order to break the mounting backlog of home buyers' applications for mortgage insurance being filed under the new housing law. "The response to the President's housing program has been so tremendous the staffs in FHA field offices have not been able to handle the volume of applications being filed," FHA Commissioner Norman P. Mason said. "That is why we have relaxed a long standing rule and are authorizing the use of fee appraisers as a temporary measure to improve FHA service to the home buying public."

In order to obtain qualified fee appraisers in the shortest possible time, Commissioner Mason pointed out, the Veterans Administration panel of presently qualified fee appraisers will be used by FHA field offices.

How Dealers Can Tie In With Builders' Sales Plans

HEATING and air conditioning dealers attending the convention of the National Association of Home Builders (scheduled to be held in Chicago, January 16 to 20) will find the merchandising suggestions offered to builders a valuable aid in preparing their own promotion programs. Numerous sessions will be devoted to merchandising, selling, public relations and related topics designed to help builders continue the high pace of building activity. Step by step programs will show the individual builder how to apply successful sales principles to his own operations. When the builders' programs are put into effect at the local level, dealers — by tying in their heating and air conditioning promotion with the builders' advertising — can take full advantage of the sales opportunities provided by the new home market.

FHA Cuts Interest Rate on Debentures

THE INTEREST RATE on debentures to be issued under the FHA Section 203 program for one to four family homes has been reduced by one-fourth of one percent, according to FHA Commissioner Norman P. Mason. He said the change from 2.75 percent to 2.5 percent, effective on mortgage insurance commitments after September 1, was made with the approval of the secretary of the treasury.

Commissioner Mason said it was an automatic reduction made in accordance with the Housing Act of 1954 to establish an interest rate consistent with the rate prevailing for other government obligations having similar maturities.

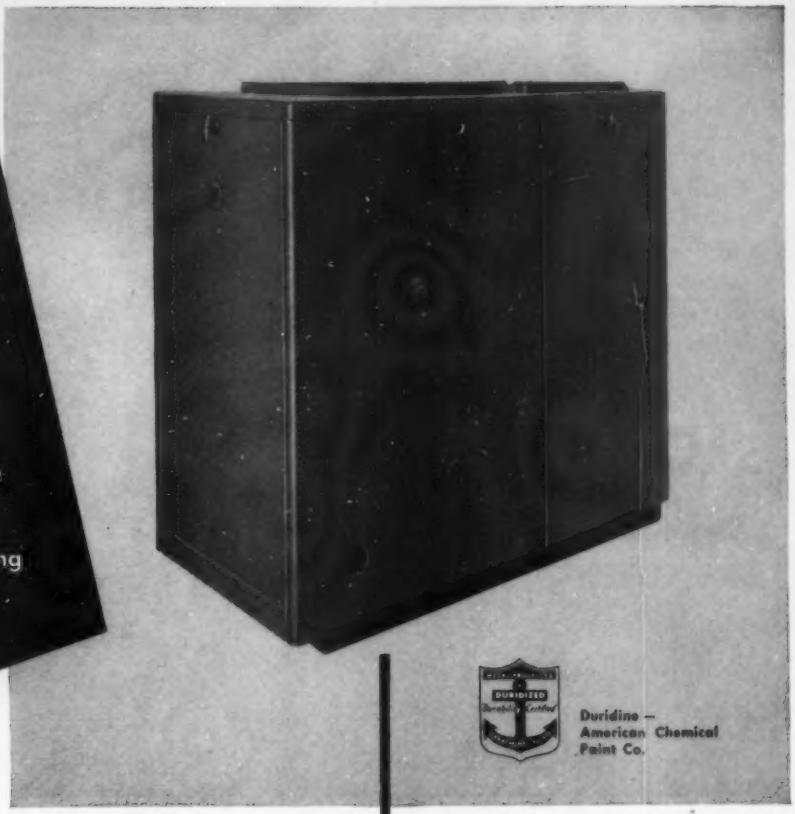
Debentures are issued to lending institutions in lieu of cash when FHA-insured mortgages go into default. The new 2.5 percent interest rate for the one to four family housing program is identical with the rate previously established for debentures issued under the FHA rental housing program.

Sees Growing Competition In Air Conditioning Field

BANK LOANS to business have been in almost continuous decline since the beginning of the year, according to the American Institute of Management, being at present 10 percent below the 1953 comparative. It is doubtful, the institute says, that business loans will continue to drop, and it is equally doubtful that present profit margins can be maintained in the face of growing competition from all quarters. As an example, it cites the fact that no industry in America "has a better statistical outlook than air conditioning — yet the flood of new competitors is severely cutting the earnings potentialities of most air conditioning manufacturers."

new winter air conditioner by RICHMOND

Compact Steel Unit in Wide Range of Capacities for Practically any Home-heating Need. Fully Automatic, Gas or Oil.



Duridine — American Chemical Paint Co.

Now, RICHMOND offers a compact "low-boy" steel furnace — the SH — in five different sizes, for a full range of warm air heating needs.

The RICHMOND SH features a stainless steel, chromium alloy combustion chamber, heavy 12 gauge heating element and unusually large filter area. Operation is fully automatic. All controls are enclosed in the sturdy steel jacket. Casing is Duridized to provide a superior bond for the handsome green enamel finish. Units are equipped with raised steel base which eliminates the need for grouting and permits installation on combustible floor.

Oil-fired types equipped with pressure atomizing burners, U/L listed and complying with commercial standard CS-75. Gas-fired units, A.G.A. approved for use with all types of gases, meet S.U.R. requirements.

You will be surprised at the reasonable cost of the SH model — it's priced right for today's more competitive heating market. Send off the coupon today for full details.

SPECIFICATIONS

Gas-fired	Oil-fired
Capacities—input Btu/hr.	Capacities—output at bonnet, Btu/hr.
SH 20G— 85,000	SH 20P— 80,000
SH 22G—110,000	SH 22P—106,000
SH 24G—140,000	SH 24P—143,000
SH 26G—175,000	SH 26P—175,000
SH 28G—220,000	SH 28P—212,000

Automatic controls—fully enclosed
Heavy 14 gauge heating element
Stainless steel combustion chamber (SH-P)
Extra large filter area
Raised base
Steel jacket —Duridized green enamel

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Affiliate of Reynolds Metals Company
HEATING EQUIPMENT

Richmond radiator co. Metuchen, New Jersey

Please send me more information and literature on the new SH Winter Air Conditioner. No obligation, of course.

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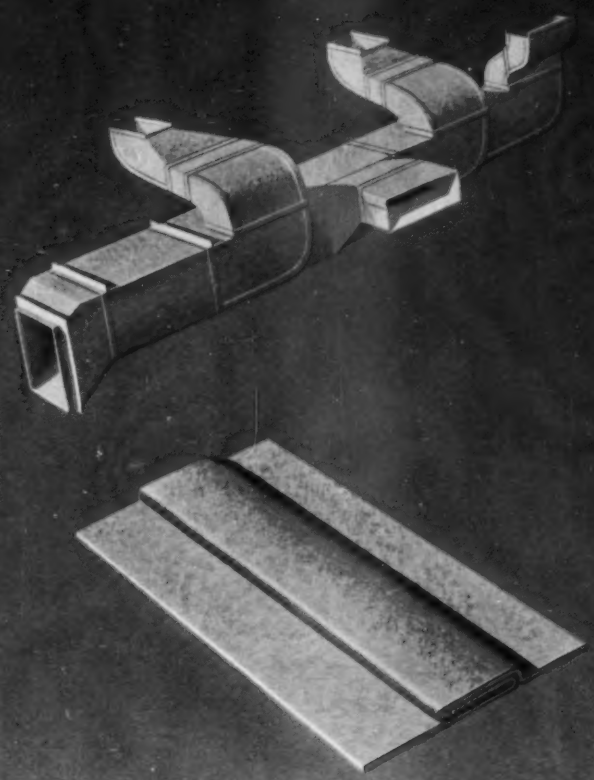
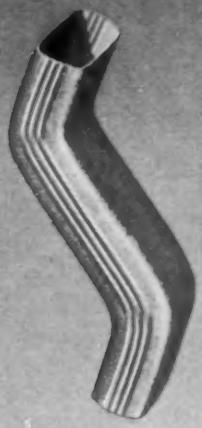
We are ( ) heating wholesalers ( ) heating contractors.

AA-12

BEST CHOICE

for all your sheet metal work





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For gutters, downspouts, air conditioning and furnace ducts, and other applications requiring a durable zinc-coated material, there's no better choice than Weirton galvanized steel—for several reasons.

Weirton galvanized steel has special qualities that stand out over the long run: A tight zinc coating that resists cracking, peeling and flaking . . . better resistance to corrosion . . . exceptional durability—all assured by Weirton's modern plant and processes, and by close control through the entire production cycle.

Next time you place an order for galvanized steel, call Weirton. Chances are we can help to make yours a better product.

WEIRTON STEEL COMPANY

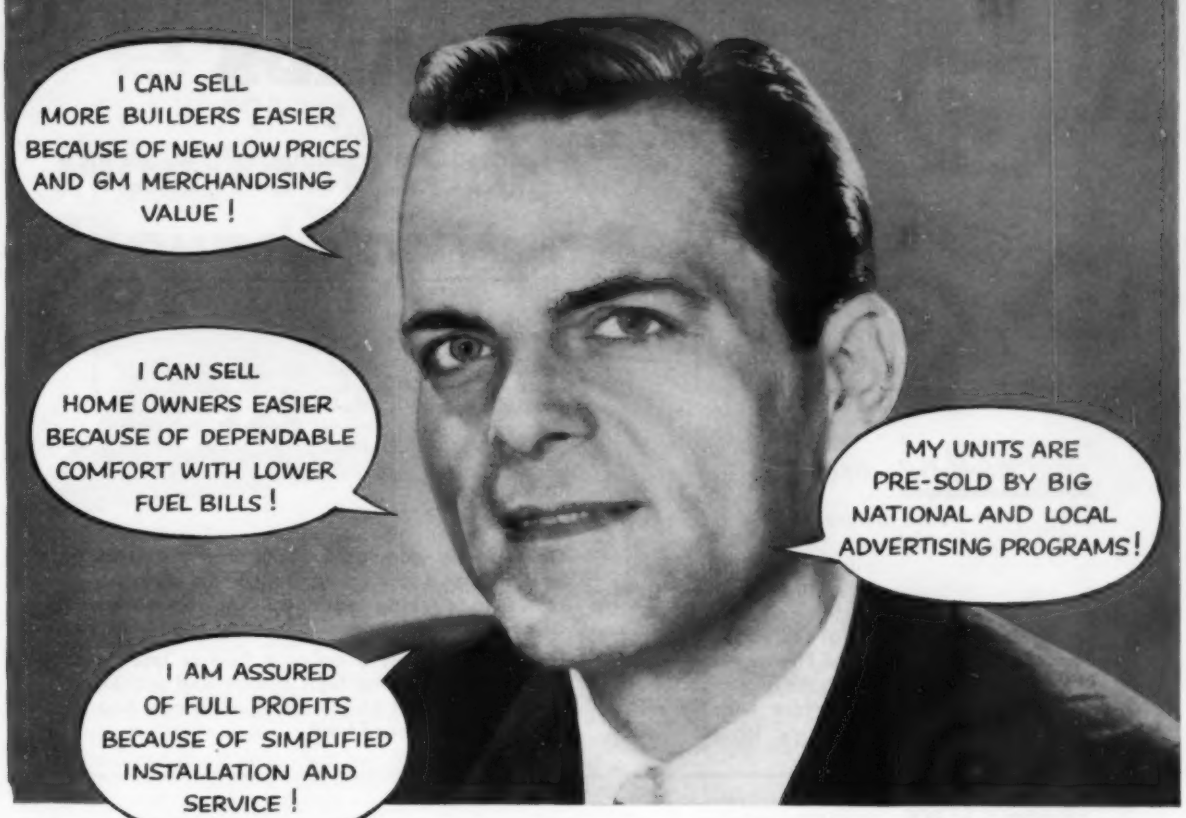
Weirton, West Virginia

WEIRTON STEEL COMPANY

NATIONAL STEEL CORPORATION

General Motors backing makes DELCO-HEAT a

4-way profit franchise for me!

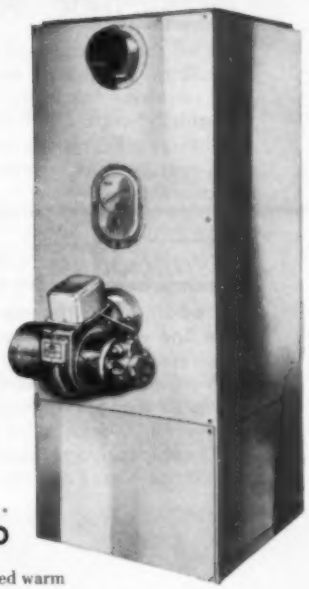

I CAN SELL MORE BUILDERS EASIER BECAUSE OF NEW LOW PRICES AND GM MERCHANDISING VALUE!
I CAN SELL HOME OWNERS EASIER BECAUSE OF DEPENDABLE COMFORT WITH LOWER FUEL BILLS!
MY UNITS ARE PRE-SOLD BY BIG NATIONAL AND LOCAL ADVERTISING PROGRAMS!
I AM ASSURED OF FULL PROFITS BECAUSE OF SIMPLIFIED INSTALLATION AND SERVICE!

And here's what a DELCO-HEAT franchise can do for you!

Only Delco can bring you the increased profits made possible by General Motors automobile production line techniques. Techniques that give you top quality products at lower unit cost—more heat from fuel, thanks to GM precision engineering—a complete, yet compact gas-fired line that fits today's modern building needs. And to top it all you'll have the support of GM advertising and merchandising methods. Yes, indeed, a Delco Franchise is your surest way to bigger profits!

Compact oil-fired "Builder Model" is the value leader model OBC 75H, a Conditionair package unit with 84,000 btu output. Designed for space-saving installation. Features exclusive Delco wrap-around design, steel cabinet and Circle-Air Radiator that adds extra heating surface--improves efficiency. Quik-Action stainless steel combustion chamber, Delco-Heat Pressure Oil Burner. Low models and reverse flow models for perimeter heating also available.

Get the facts about the new franchise territories available now. Write Delco Appliance Division, Dept. AA, General Motors Corp., Rochester 1, N. Y.



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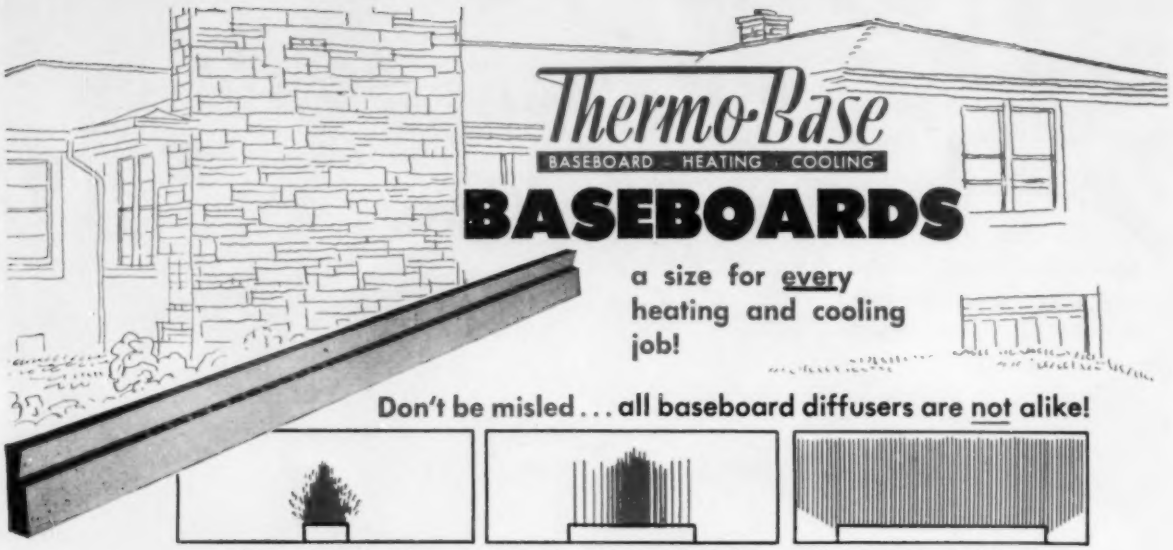
For a good deal . . . DEAL WITH DELCO

. . . a complete line of automatic oil and gas-fired conversion burners, Conditionair forced warm air furnaces and heating and cooling units, boilers, water heaters, and electric water systems.



Thermo-Base

BASEBOARD - HEATING - COOLING

BASEBOARDS

a size for every heating and cooling job!

Don't be misled . . . all baseboard diffusers are not alike!

Some are too small

some have uneven distribution

Thermo-Base distributes air evenly throughout its entire length.

Thermo-Base REGULAR

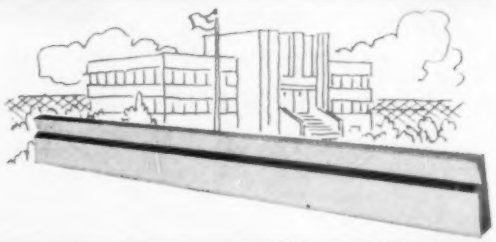
Only Thermo-Base assures better results by completely blanketing outside wall and window surfaces . . . distributing warm and cool air evenly throughout its entire length. This gentle diffusion of air is the only way to take the forced air "feel" out of the forced air system. The simple styling of Thermo-Base lends a touch of good design to any interior. Full length drapes do not interfere with its efficient operation.

Only a few minutes are required to install each 8, 5 or 3 foot unit in new or old construction. No roughing in is necessary. Units may be combined for continuous coverage.

Thermo-Base costs a dollar a foot or less (in zone 1) for the same high quality and proven performance that has made it America's best warm air baseboard buy!

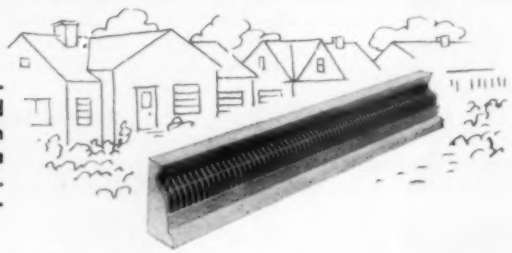
Thermo-Base SUPER

has all the advantages of Regular Thermo-Base but is specifically designed to handle the greater volume of air required for large areas. It is ideal for use in schools, churches, offices, stores, factories and public buildings. Fronts are readily removable should cleaning ever become necessary. It's ideal for cooling, too!



Thermo-"30" America's lowest-priced baseboard diffuser!

The addition of Thermo-"30" Diffuser to the Thermo-Base line will enable you to get **all** of your baseboard requirements from **ONE SOURCE.** This new 30 inch high-capacity baseboard unit can be used either as a warm or cool air diffuser or as a return air register. Its low $2.00 each price (in zone 1) will sell fast in today's competitive market!



SEND TODAY!

We'll show you how this **complete line** will simplify ordering, delivery and inventory . . . and how it will enable you to make **extra profit** from every baseboard sale!

Gerwin Industries, Inc., Michigan City, Indiana

Luxaire®

YEAR 'ROUND AIR CONDITIONING

FOR 1955

Plan Your Year 'Round Profits

NOW!

Your customers, particularly builders, are already planning to use more Year 'Round Air Conditioning units next year. Prepare, now, to grasp the opportunity — to expand your business on a profitable year 'round basis with Luxaire.

The same foresight that has achieved Luxaire's eminent place in winter air conditioning now brings you year 'round units — planned, engineered and built to *increase your profits* with Luxaire profit-leadership features . . .

- More efficient and economical operation with two stage cooling from two, independent, thermostat-controlled compressors and hermetically sealed cooling systems.
- Readily interchangeable gas or oil-fired heating.
- Complete five year protection plan on cooling systems.
- Compact add-on cooling units for present or future installation.
- Matchless Luxaire-styled cabinets.

The same competitive pricing that you already appreciate in Luxaire also applies to Luxaire Year 'Round Air Conditioning. With Luxaire, you can bid and meet the most competitive jobs — new homes, building projects or replacements — and still make money. *And you cannot buy better quality at any price!*

A call, card or letter to your Luxaire jobber, today, can start your year 'round profit picture, now!

Year 'Round Unit equipped with oil Burner.

The same Year 'Round Unit equipped with Gas Burner.

A typical example of a Summer Air Conditioner connected to a Forced Air Unit.

Summer Air Conditioning Unit with circulating Blower Assembly.

NEW...to Arrive in '55

NEW Air Cooled Compressors — Remote Type

For installations where water supply is a problem or water cooling too expensive. In all 2 ton or 3 ton cooling systems Luxaire will offer a choice of either water-cooled condensers — or air-cooled condensers which can be placed away from main unit in out-of-the way places.

NEW Counterflow Year 'Round Units

For combination heating and cooling in basementless homes. Two, new Luxaire units in the most wanted sizes. 2 ton cooling with 100,000 BTU input heating and 3 ton cooling with 140,000 BTU. Both with either air or water cooling condensers. Both easily convertible for gas or oil. Each unit will have a single, compact Luxaire cabinet.

NEW 5 Ton Year 'Round Combination Units

Now, for every type of climate Luxaire offers high capacity cooling with a flexible range of matching heating capacities—140,000, 175,000 and 210,000 BTU inputs. Heating units burn gas or oil with equal efficiency. Compact, Luxaire-styled cabinets.

THE C. A. OLSEN MANUFACTURING COMPANY • • ELYRIA, OHIO

Luxaire HEATING & AIR CONDITIONING UNITS

BARBER COLMAN

"UNI-FLO" ENGINEERED

Air Distribution

. . . used throughout new Oklahoma A&M Library!

Students study in comfort in this outstanding new library at Oklahoma A&M. Complete with summer-winter air conditioning, the new structure is rated as one of the finest college libraries in the nation. Air distribution throughout the building is handled by Uni-Flo equipment—ceiling diffusers as well as supply, return, and door grilles. This is the eighth building constructed in the past six years on the Oklahoma A&M campus where Barber-Colman equipment has been specified. Strong testimony, indeed, to the design, construction, dependable performance and engineered results of using modern Uni-Flo developments.

Architects: Sorey, Hill & Sorey, Oklahoma City. *College Architect:* Philip A. Wilber, Stillwater. *General Contractor:* Manhattan Construction Company, Muskogee. *Sheet Metal Contractor:* Clint Cooke Company, Oklahoma City and Stillwater, Okla.

Spacious "browsing room" with Venturi-Flo Ceiling Diffusers above, Uni-Flo Sidewall Diffusers and Return Grilles on the firred panels between windows. Each ceiling diffuser has integral volume control for simplified balancing of system.

New library building at Oklahoma A&M is the pride of the Stillwater campus. It is one of the latest results of a multi-million dollar building program undertaken at the school in recent years.

Reference Room on second floor. Exceptionally quiet operation of Uni-Flo equipment makes it particularly suitable for library applications.

Reserve Reading Rooms, where Uni-Flo Sidewall Diffusers and Return Grilles in finned panels provide efficient distribution of conditioned air.

Reserve Reading Room, one of two located on first floor of library. Uni-Flo Sidewall Diffusers provide unobtrusive decorative patterns in keeping with the modern treatment of the interior . . . supply conditioned air free from draft and disturbing noise.

BLAZING THE TRAIL *TO BETTER AIR DISTRIBUTION*

First with integral volume control

Among many pioneering "firsts" accredited to Barber-Colman research is this opposed-blade type integral volume control. Linear control of volume extends from full open to shutoff. Blades are gang-operated from a single lever. The lever is hidden from sight, but easily accessible for adjusting volume. Volume control is available on all types of Barber-Colman ceiling diffusers, round or square, recessed or surface mounted. For information on this, and the dozens of other Uni-Flo "trail-blazing" features, call your nearby Field Office (consult phone directory), or write us.

BARBER-COLMAN COMPANY, Dept. L, 1106 Rock St., ROCKFORD, ILL., U.S.A.

Washington Letter

FHA Credit Opens the Door for Dealers

By Arnold Kruckman

CONGRESS, in its recent session, authorized the Federal Housing Administration to underwrite insurance for various types of building enterprises to a gross total of $22,592,900,000. One billion seven hundred fifty million dollars is designated for Title I projects; $20,342,900,000 is retained for Title II and other FHA undertakings. Over 98 percent of the $20 billion underwriting eventually will be used for Title II projects. The President is given authority to supply $500 million in additional authorization to FHA when and if, in his opinion, the sum, or any part of it, is required for any of the work of FHA.

Title II enterprises cover a variety of undertakings. On the whole, they are more extensive than those undertaken otherwise by FHA.

Title I provisions also have a very special interest to those who supply warm air heating equipment and those who do sheet metal contracting. They are designed very particularly for these types of operations.

Channel Loans Through Dealers, Contractors

The significance of Title I can probably be made most clear by what the FHA itself says about it. They tell you that it provides a procedure under which qualified lending institutions may extend credit to borrowers *through* dealers or contractors.

The first thing for a dealer or contractor to do is to establish a working arrangement with a qualified Title I lending institution. The regulations require that the institutions make certain that the contractor or dealer is reliable, financially responsible and qualified to perform satisfactorily the work to be financed.

The structure in which the improvements are to be supplied, and for which the procedure of a Title I loan may be used, must exist as a completed building. Repairs, alterations and improvements must be physically attached to the structure in such a way as to become a part of the structure or be directly connected with it.

For example, structural additions or alterations include many items, among which are listed heating installations and repairs, including furnace, duct work, oil burners, stokers, tanks and water heaters.

It is stressed that appliances are not eligible.

Who's Eligible?

Title I loans may be made to owners of the real property to be improved, to lessees having a lease extending not less than six months beyond the maturity of the loan, or to parties purchasing the property on contract. In addition, of course, the borrower must have a salary or other steady income which will enable him to repay the loan, and he must have a good credit reputation.

The FHA chart for a Title I loan indicates that the maximum maturity of a loan for repairs, alterations or improvements of an existing structure is fixed at three years and 32 days. The maximum amount of a loan for the purpose is $2500; maximum financing charge is $5 discount per $100 a year.

It is stressed that the maximum loan obtainable to install heating improvements in an existing structure, and to supply sheet metal work, may not exceed $2500.

However, if the alterations, repairs, improvements, or conversions have to do with an existing structure, used or to be used as an apartment house or a dwelling for two or more families, the maximum loan is $10,000, and maximum maturity is seven years and 32 days. A loan of this kind carries a maximum financing charge of $5 discount per $100 a year if $2500 or less, $4 discount per $100 if in excess of $2500.

FHA, Title I Division, emphasizes that the borrower must repay his loan in installments to a lending institution. Most loans must be paid on the first, or during each successive month. Practically every lending institution of any consequence in the United States is able to supply the FHA *gross charge and discount tables* which list exact monthly payments for loans of various amounts and for various durations. Obtaining these tables will

(*This article continued on page* 32)

SEALED-IN LUBRICATION cuts motor servicing. Motor operates at any angle . . . no need for "specials."

G.E. announces shaded-pole motors in ratings thru 1/6 hp

Light, small and exceptionally efficient, these motors offer many advantages to ventilating-equipment designers

Now! General Electric brings manufacturers of air-moving equipment all the benefits of shaded-pole construction in a 1/6-hp motor! It's the completely new G-E KSP39 frame motor . . . and the increased power gives you wider design latitudes than ever before with the proved, low-cost G-E shaded-pole line.

Among the many benefits of this new motor is an operating efficiency that makes it easier to provide for motor ventilation in the equipment you design. In addition, because this new motor draws less current it is ideal for air conditioner use since additional current can be diverted to the compressor motor.

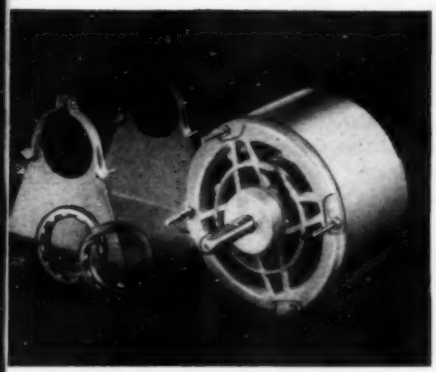
Other features include small size, forced internal cooling provided by aluminum fan blades; sealed-in lubrication; mounting versatility and all the other advantages G-E shaded-pole construction offers.

Whatever your products . . . room air conditioners, furnace blowers, ventilating fans, unit heaters and coolers or the like . . . you'll find new opportunities to streamline your product and increase its saleability with a G-E shaded-pole motor.

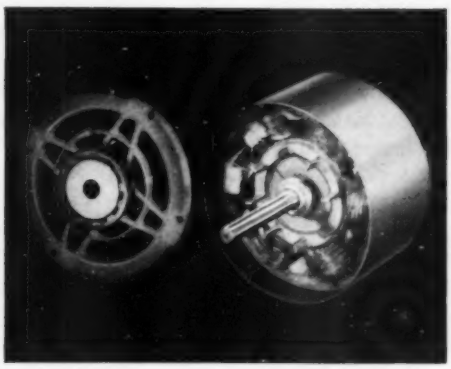
Low in cost, this new "39" frame motor is available with single or double shaft and in ratings from 1/12 thru 1/6 hp. For full details on this and other motors in the shaded-pole line, contact your nearby G-E Apparatus Sales Office today . . . or write for bulletin GEA-6134 to General Electric Company, Section 704-25, Schenectady 5, N. Y.

Progress Is Our Most Important Product

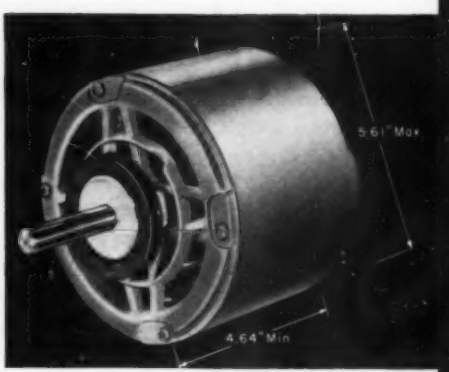
GENERAL ELECTRIC



MOUNTING VERSATILITY helps solve design problems. Use resilient cradle-base, end-ring or pulley-end mounting.



FORCED INTERNAL VENTILATION from aluminum fan blades means cooler operation, longer motor life.



SMALL SIZE of this new motor makes it possible to design smaller, better-looking products, save on material, too.

WASHINGTON LETTER—

FHA Backs Dealer Loans —

(*Continued from page 29*)

save the contractor or dealer much time because they supply the calculations and enable the dealer or contractor to quote to his customers the precise monthly payments required to repay his loan.

The dealer's or contractor's most direct responsibility, in the opinion of FHA, is the loan which he himself initiates. A step-by-step outline suggested by FHA is designed to bring complete understanding of the loan procedure between the dealer or contractor and his lending institution. The lender will supply the necessary forms to the contractor or dealer. These include: 1) a credit application; 2) the note; 3) the FHA Title I completion certificate; 4) gross charge and discount tables.

FHA Suggests Orderly Loan Procedure

Step 1 is a written proposal to be addressed to the customer, giving a detailed description of the work to be done. Then the customer should be told the amount and number of his payments necessary to pay the loan in full. Once the work is agreed upon, the contractor prepares and signs a contract or sales agreement in at least three copies — one for himself, one for the customer and one for the lending institution.

Next, a credit application is filled out carefully, completely and accurately, in cooperation with the customer, and sent to the lending institution. It is this document which will lead the institution, after an analysis, to notify the contractor or dealer and his customer whether it will make the loan.

Obviously, if the arrangements are satisfactory, the work will be done, and in due time the customer will sign an FHA Title I completion certificate. Next, the dealer or contractor signs the completion certificate, and delivers it with the signed note to the lending institution, which then advances the money to the dealer or contractor, provided at least six days have passed since the customer was notified of the approval of his application.

The FHA repeatedly emphasizes, through its Title I division, that contractors or dealers who do business under Title I must comply with all of the Title I regulations. This means that every dealer is expected to familiarize himself with the proper methods for handling Title I loans and to employ these methods in the handling of every loan which he initiates.

FHA underlines the fact that it expects the contractors and dealers with whom it does business to avoid overpricing, false guarantees, falsified credit applications, misrepresentations of product, the deceptive "model home" method of merchandising, the offering of cash bonuses or commissions as an inducement to purchase, and the giving of ineligible gifts or premiums. It warns that these tactics often stem from over-zealousness on the part of salesmen to make a profit or commission.

Complete Customer Instruction Urged

The customer should be told his note will be sold to the lending institution if he is eligible for credit; and he should be fully advised about the cost of the job, the cost of financing, and the monthly payments. FHA insists that the customer have a very full and detailed understanding of the transaction and the obligation he is assuming, and that he fully comprehends the meaning of the paper he will be asked to sign.

FHA is sincerely concerned about the activities of salesmen who may make illegitimate deals. The agency emphasizes that it is found the "smart boys" often go swiftly through an area, getting contracts which should be obtained by the regular dealers and contractors. FHA does what it can to keep the business for the regular contractors and dealers.

Functions of FHA

A summary of the history of FHA was recently published in Washington. It was established under the National Housing Act, approved June 27, 1934. Since 1947 it is a constituent of the Housing and Home Finance Agency. The government says its chief purposes are to encourage improvement in housing standards and conditions, to provide an adequate home financing system, and to exert a stabilizing influence in the mortgage market. FHA does not make loans, and does not plan or build housing.

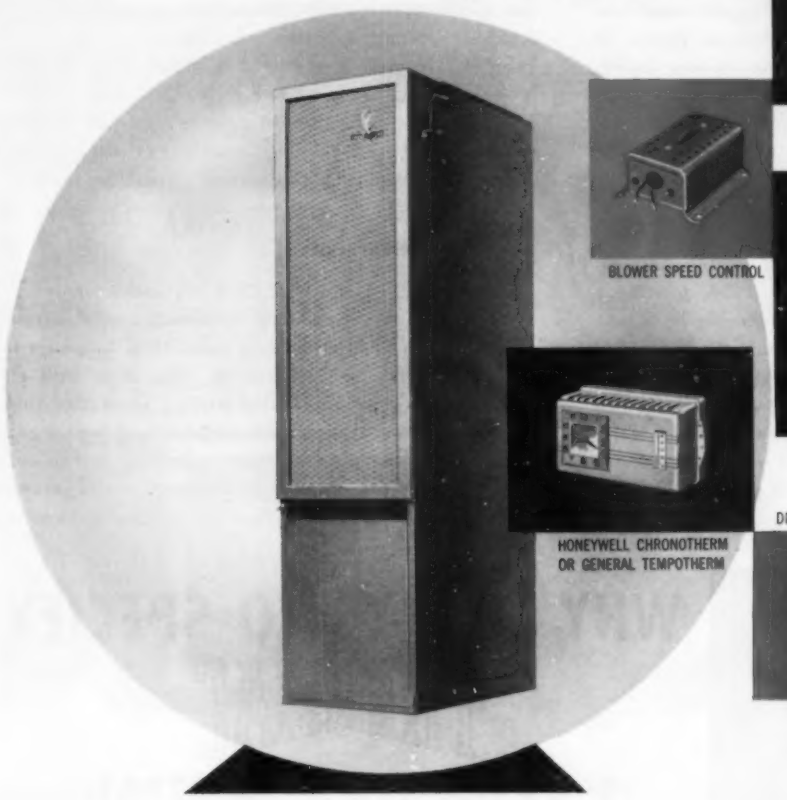
Monthly mortgage payments made to FHA cover principal; interest if not over 4½ percent for individual home mortgage, and not over 4¼ percent for mortgages on multi-family projects; the FHA mortgage insurance premiums computed at one-half of one percent annually on outstanding balances of principal; fire and other hazard insurance premiums; real property taxes; and any special assessments and ground rent.

Home mortgages insured by the FHA may contain a so-called *open-end* provision under which the outstanding balance may be increased by amounts advanced to the borrower for improvements, alterations or repairs to the property. Such advances may not increase the outstanding balance to an amount greater than the original mortgage amount, unless they are used to add rooms or other enclosed space to the dwelling.

It is repeated that Title I of the National Housing Act authorizes FHA to insure financial institutions against loss on loans made to finance alterations, repairs, and

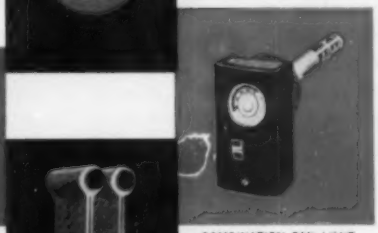
ROYAL JET BRINGS NEW BTU'S* TO HOME HEATING

*BUDGET TAILORED UNITS



HONEYWELL "ROUND" THERMOSTAT OR GENERAL CONTROL "THIN" THERMOSTAT

BLOWER SPEED CONTROL



COMBINATION FAN LIMIT CONTROL

ROYAL JET GLASS ELEMENT

HONEYWELL CHRONOTHERM OR GENERAL TEMPOTHERM

SOLENOID AUTOMATIC VALVE

DIAPHRAGM GAS VALVE

THE FORCED AIR FURNACE...TODAY

Royal Jet performs new home heating magic!
A NEW FORCED AIR FURNACE... A NEW WAY TO SELL! Royal Jet eliminates the major obstacle of furnace selling with *Budget Tailored Units. Now you can sell a "Tailor Made" forced air furnace.
A furnace tailored to the particular requirements of any job... whatever the size of the home... whatever the price range. You control your bids by specifying precisely the extra features the builder or owner prefers. Every extra feature, or accessory, is listed with its price to allow you to accurately calculate costs. Now you can tailor a Royal Jet furnace to every builder's heating budget. Royal Jet *Budget Tailored Units offer you the advantage of complete flexibility in the planning and selling of home Heating.
Royal Jet *BTU's... the modern... efficient way to sell.

The new Royal Jet Forced Air Gas Furnace is an outstanding achievement in craftsmanship. It combines ultra-modern design with advanced engineering techniques to offer you many new advantages. Quieter fully automatic performance... simplified maintenance... economical efficiency. Lightweight compactness is the keynote of the Royal Jet. The RFA 80... 58¼" high x 14¾₁₆" wide x 25⅞₁₆" deep... can be installed in a standard 30" closet faster, easier, more economically. For the rated size of the furnace, the Royal Jet requires an absolute minimum of floor space. Now available are Upflow models ranging from 75,000 to 150,000 BTU input and Counterflow models ranging from 75,000 to 110,000 BTU input. All models may be ordered as De Luxe Budget Tailored Units or as super quality Custom Units.

For complete information contact your local heating dealer or phone Royal Jet • ATlantic 9-4239

Royal jet

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all furnaces approved by the American Gas Association

improvements to existing structures. The extent of FHA liability for insurance of these loans is limited to 90 percent of the loss on individual loans and 10 percent of all such loans made by the institution.

Under present law, FHA authority to insure property-improvement loans expires on June 30, 1955.

It is not generally known that the most immediate objective of the National Housing Act, as passed in 1934, was, and is, to encourage private lending institutions to make money available to finance needed repairs to homes and other property, as well as to finance the construction of new homes.

Items Ineligible for Financing

Regulations under Title I, Section 2, of the National Housing Act, as effective October 1, 1954, provide a list of items that are not eligible for financing by a loan under Title I. Paragraph 201.7(a) establishes a *List of Ineligible Items* which includes items, products, alterations, repairs or improvements, or classes thereof, which the FHA Commissioner has determined not to be eligible for financing with the proceeds of loans reported for insurance under the regulations in this part.

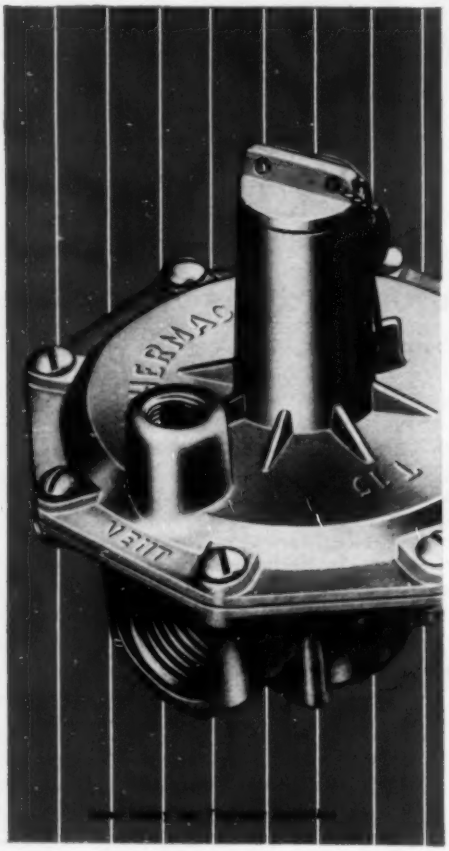
Among the ineligible items for which no part of the proceeds of a loan made on or after June 10, 1954 shall be used to finance an installation are: flower boxes, greenhouses, airplane hangars, kennels, penthouses, radiator covers or enclosures, stands, patios (unless permanently affixed to an existing structure and roofed.)

The document provides addition of other ineligible items to the list as seen fit by the Commissioner.

Regulation VIII of Title I (approval of dealers) provides "the file should show conclusively that a dealer or contractor pays his bills, has a clear record, and has the financial strength to operate his business properly. The insured institution is required to obtain from the dealer a current balance sheet and profit and loss statement. In addition, a credit report of a commercial credit reporting agency should be obtained. Periodic review of the financial condition of the dealer should be made."

Lender To Bear Loss

Under date of October 1, 1954, regulations under Title I, Section 2, were amended to permit special arrangements between insured lending institutions to assure that the 10 percent loss incurred in connection with each claim be borne by an insured lending institution rather than passed on to a dealer, contractor, borrower or others. If more than one insured lending institution is involved, as in the case of an origination and servicing agreement, it is expected that the 10 percent loss will



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THERMAC
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SMALL SIZE — LARGER CAPACITY is the chief reason for the unprecedented demand for Thermac pressure regulators.

EASY TO SERVICE. Few rugged parts easily accessible without removing regulator from line.

DEPENDABLE, CONSISTENT PERFORMANCE. Constant pressure regulation eliminates pilot light failures due to fluctuating pressures and assures proper operation of automatic controls.

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NATIONALLY ACCEPTED by all utility companies for servicing. Standard equipment with many leading gas appliance manufacturers.

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THERMAC GAS SHUT-OFF VALVE—Aluminum Alloy
This high capacity, low restriction manual main gas shut-off valve, when used with Thermac regulators, provides an unusually low cost assembly.

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Crucible Rezistal® stainless steel *always* keeps its bright, attractive finish. For stainless has no surface finish to wear or chip away. It's *stainless* all the way through.

Yes, Crucible stainless steel is a beautiful but *practical* metal. That's why you'll find it being extensively used as architectural trim, in food processing equipment, in hospitals, on your car, or in your own kitchen. Actually, you'll find stainless profitably used wherever you turn, for if you can make it of metal — you can make it better of Crucible stainless steel.

Be sure *you* take advantage of the unique properties of Crucible stainless steel . . . its corrosion and wear resistance, exceptional strength, and ease of cleaning. A Crucible engineer can help you make the most of stainless for your individual application. A call will put him to work for you.

CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking **STAINLESS STEELS**

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for Metal Applications
for use by manufacturers of
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equal and unequal wings . . . ¾" to 3½" widths . . .
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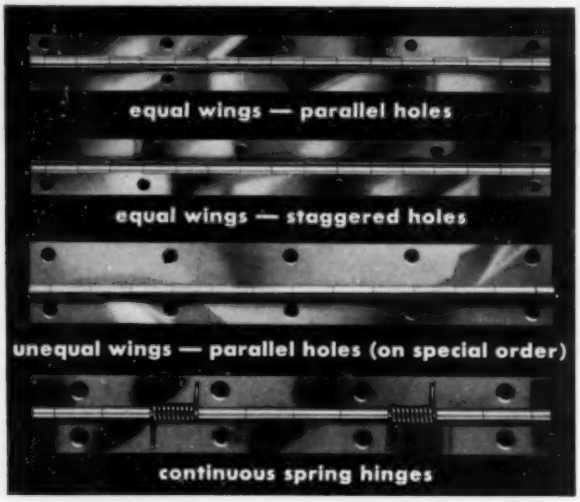
available in steel, brass, monel metal, aluminum


equal wings — parallel holes
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NATIONAL LOCK COMPANY
Rockford, Illinois

WASHINGTON LETTER —

be borne by the institution initially reporting a loan for insurance.

It is the consensus of government agencies having to do with construction, building and materials that about $37 billion will be spent in new construction and $15 billion in maintenance and repairs during 1954.

In September, according to the U. S. Department of Labor, new construction activity reached an all-time peak of $3.6 billion to round out the most active quarter on record for the industry. Non-farm housing starts totaled $106,000 in October; private dwelling units put under construction during the first ten months of the year reached approximately 999,000, a rate of approximately 1.2 million per year. The U. S. Department of Labor reported there was a small drop in apprentice training, except in sheet metal work, where there was a sharp 7 percent rise, and in structural iron work which experienced a rise of 44 percent in apprentices. The rise for structural iron work is reported to be the result of the recent initiation of a new program and set of standards for apprenticeship in this trade.

Plan 1.2 Million New Units in '55

Housing Administrator Albert M. Cole is making a strong effort to provide 10 percent of all new housing as construction for minority groups. Mr. Cole estimates new housing next year will total more than 1.2 million units. The National Association of Home Builders is urging Mr. Cole and the government to make certain that at least 10 percent of this number is available for minority groups. It is estimated there are over 16 million minority families in the country whose incomes have risen sharply since World War II. These groups are regarded as appropriate customers for new housing.

The report is that there is adequate credit in all areas for such housing; but it is expected that city authorities will have to give aid in planning zoning changes to encourage big-scale construction.

The word is around that the President wishes to provide some "special assistant funds" which were authorized as reported in this article. He wishes to use these funds, according to report, to supplement the credit for minority housing in areas where it is scarce.

The President has the authority to order the Federal National Mortgage Association to earmark part of its resources to provide minority housing. If the plan is carried out, banks would be encouraged to grant mortgage loans for minority housing if, as proposed, the government association guarantees in advance to buy the mortgages from the banks at any time.

Some time in December or January, under the President's approval, a National Advisory Conference on Minority Housing is to be called in Washington to discuss housing for minority families.

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The Quiet-Acting GAS VALVE—Performance Proven for Reliable Service on Thousands of Installations!

Check These Features

- Quiet operation—no click, no hum
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- Compensated for changes in ambient temperature
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NO. 411—*the sensitive and accurate Timed Cycling Thermostat for all types of heating systems. Provides close control of room temperature. Attractively styled, easily installed and adjusted. Write for Bulletin No. 193 and Form No. 1545-A.*

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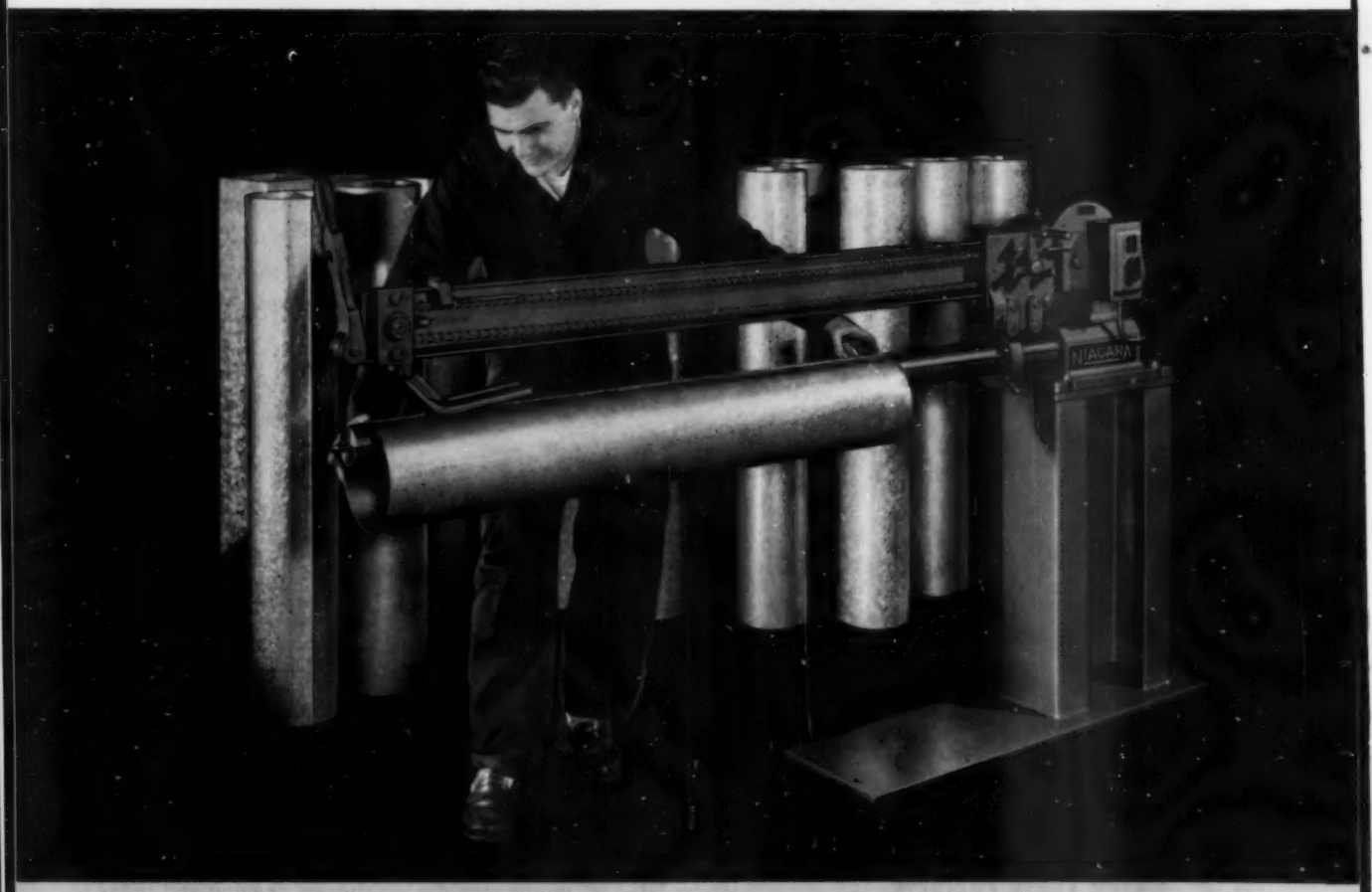
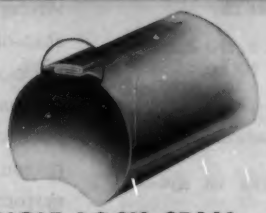


DOES BOTH!



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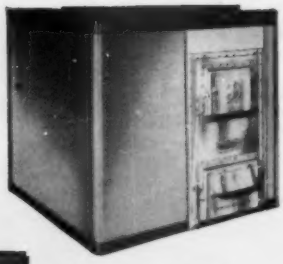
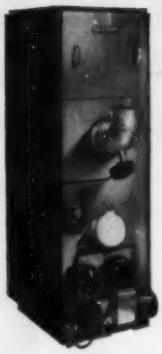
Assembled Oil Horizontal



Coal Flo-Warm

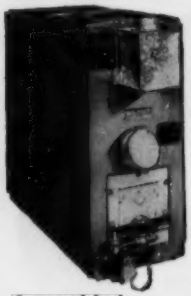
Gasaver DeLuxe Lo-Boy

Assembled Gas Horizontal

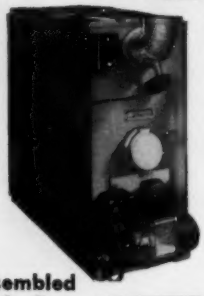


Assembled Oil Counter-Flo

Gas Flo-Warm Gravity



Assembled Gas Lo-Boy



Assembled Oil Lo-Boy

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Here's the most complete line of furnaces, fittings and air conditioning units ever offered.
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GAS ASSEMBLED	3 Models Available Later	4 Models 70,000 to 140,000 B.T.U.	4 Models 70,000 to 140,000 B.T.U.	5 Models 70,000 to 140,000 B.T.U.	4 Models 60,000 to 120,000 B.T.U.
OIL FLO-WARM	2 Models 105,000 to 133,000 B.T.U.	8 Models 105,000 to 250,000 B.T.U.	4 Models 105,000 to 189,000 B.T.U.	2 Models 105,000 to 140,000 B.T.U.	
OILSAVER FLO-WARM	2 Models 105,000 to 133,000 B.T.U.	7 Models 105,000 to 250,000 B.T.U.	3 Models 105,000 to 189,000 B.T.U.		
GAS FLO-WARM	3 Models 85,000 to 140,000 B.T.U.	7 Models 85,000 to 250,000 B.T.U.	1 Model 85,000 B.T.U.		
GASAVER DELUXE FLO-WARM	3 Models 85,000 to 140,000 B.T.U.	7 Models 85,000 to 250,000 B.T.U.			
DUO-FUEL FLO-WARM	3 Models 85,000 to 140,000 B.T.U.	4 Models 100,000 to 190,000 B.T.U.			
COAL FLO-WARM	9 Models 65,750 to 163,375 B.T.U.	6 Models 102,000 to 275,000 B.T.U.			
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Oil Flo-Warm Hi-Boy

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Gentlemen:

Yes, rush me details on the complete WILLIAMSON *Line.*

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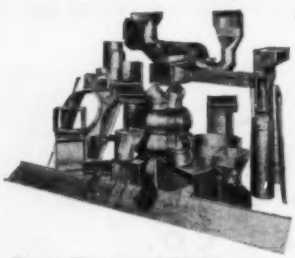
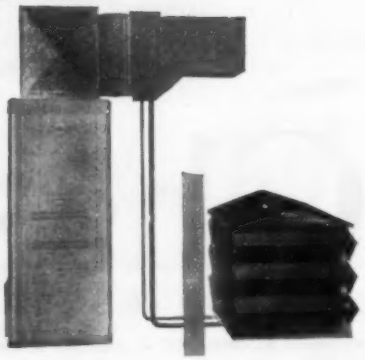
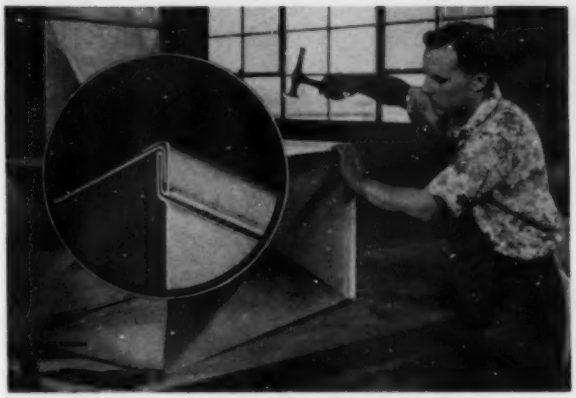


Duct, Pipe and Fittings

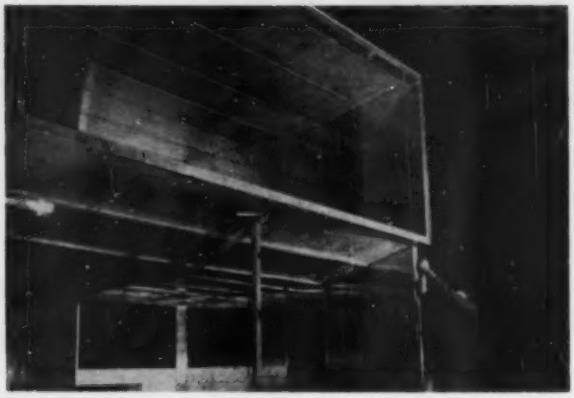


Air Conditioning Units
(Air Cooled Unit Shown)

Four ways you profit with
KAISER ALUMINUM UTILITY SHEET

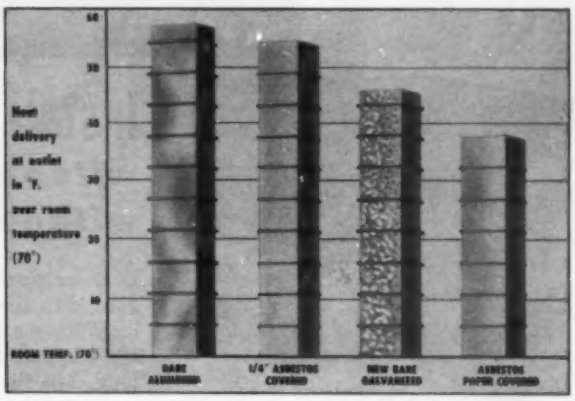


1 **Takes perfect Pittsburgh lock seam!** The exceptional workability and great strength of Kaiser Aluminum Utility Sheet mean that it will take and hold a perfect Pittsburgh Lock Seam—with the same methods used for galvanized.



2 **Cuts metal costs** because pound for pound aluminum covers three times as much area as galvanized. And aluminum's efficiency permits much smaller ducts, saving metal and fabrication time.

3 **Saves 10 to 12 per cent** in installed cost because aluminum's light weight speeds handling and erection, permits lighter supports. And no insulation is needed.


Heat delivery at outlet in °F. over room temperature (70°)
ROOM TEMP. (70°)
BARE ALUMINUM
1/4" ASBESTOS COVERED
NEW BARE GALVANIZED
ASBESTOS PAPER COVERED

4 **Delivers much more heat** than bare galvanized or asbestos paper-covered ducts because of aluminum's low emissivity and high thermal reflectivity. No red rusting, no coating to crack or peel.

For complete information, contact any Kaiser Aluminum sales office, located in principal cities, or one of our distributors. Kaiser Aluminum & Chemical Sales, Inc. *General Office,* Palmolive Bldg., Chicago 11, Ill.; *Executive Office,* Kaiser Bldg., Oakland 12, California.

Important information about gauge sizes! The Brown & Sharpe gauge used for aluminum is two numbers *higher* than the Standard gauge used for galvanized. Thus, for example, 18 ga. aluminum and 20 ga. galvanized are the same thickness (.040").

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Send coupon for free folder. Helps you take full advantage of aluminum's unique combination of properties. Availability charts on Kaiser Aluminum Utility Sheet in both flattened and coiled sheets, including thicknesses, weights, etc. Also contains weight and coverage comparisons for aluminum and galvanized. Mail coupon today!

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without precision cutting and... without fitting of separate pieces

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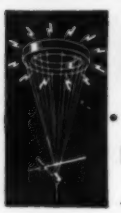

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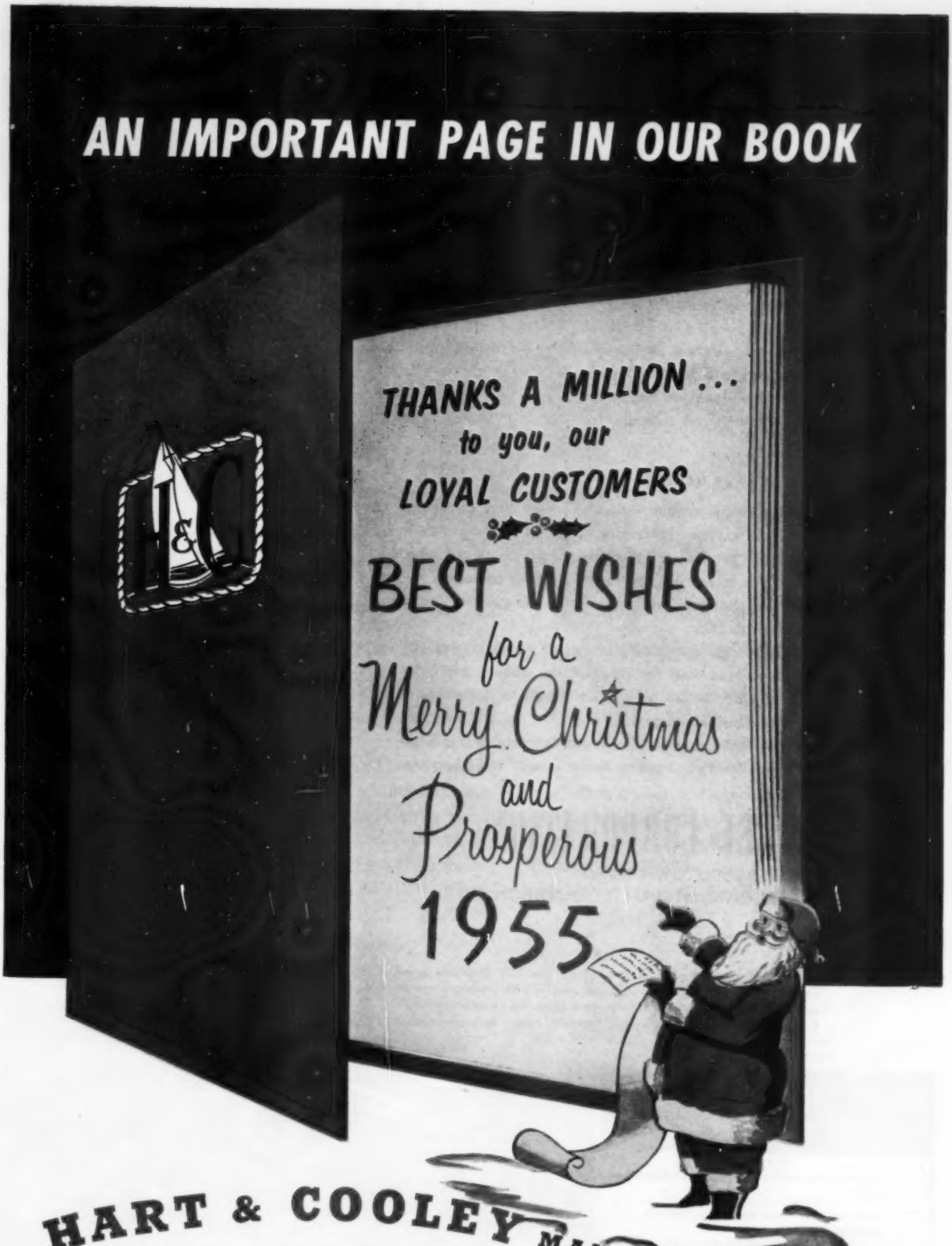

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First: Every job pays you more because of the higher quality of this durable metal.

Second: Your customers will be better satisfied—and their word-of-mouth advertising will lead to more jobs. The reason is that Armco Stainless Steel needs no maintenance. It will last as long as the building itself. *Yet its cost compares favorably with that of other high-grade metals.*

WITHSTANDS HEAVY LOADS

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Remember, your nearby Armco Distributor is ready to supply all the Armco Stainless Steel you need for roof drainage and other uses.

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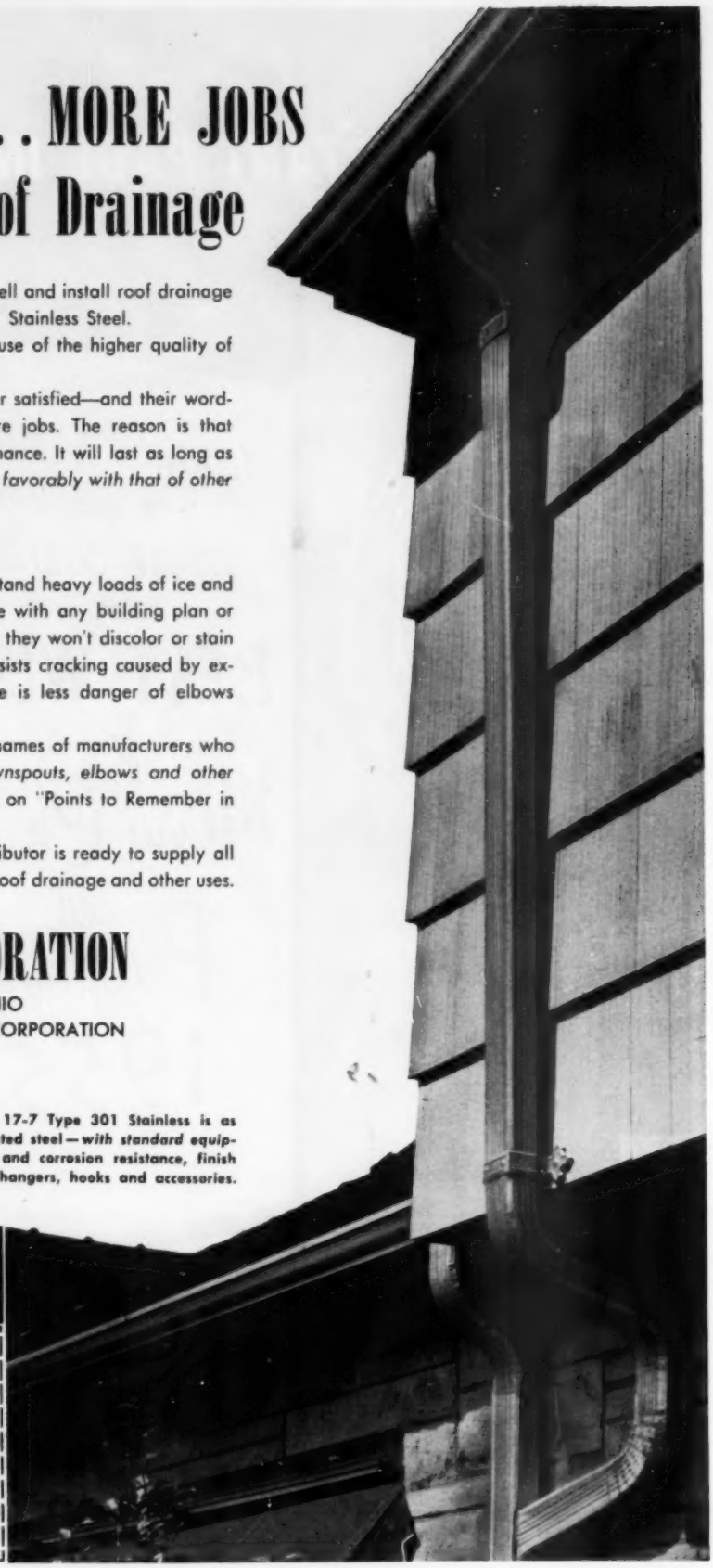

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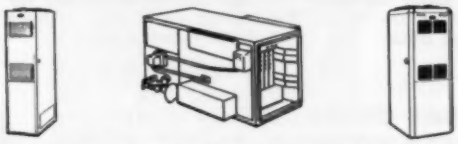

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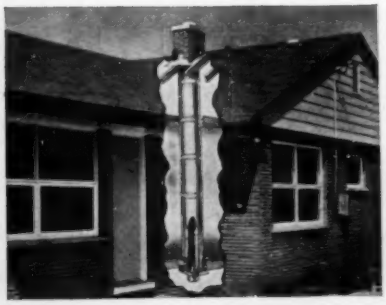
Genuine masonry Van-Packer chimney goes up by sections in 1½ hours

Easy-to-use plastic squeeze bags provide the acid-proof cement permanently sealing each joint (above). Van-Packer Chimney withstands 2100° F., is UL listed for zero clearance.



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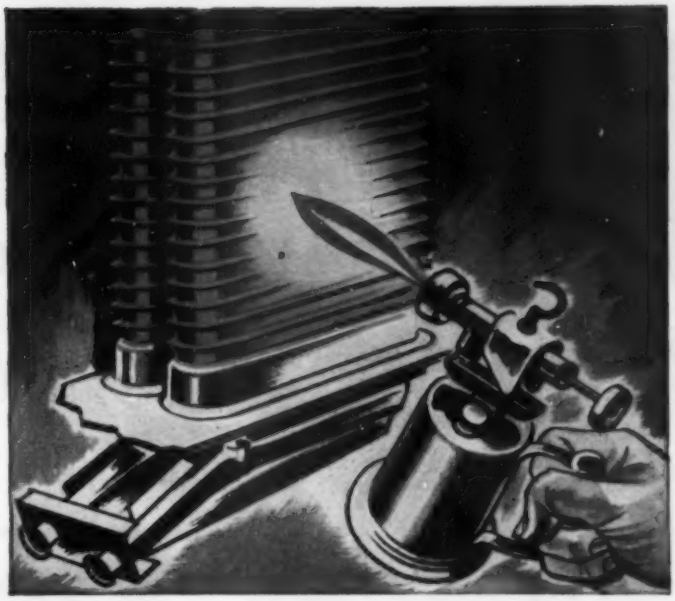

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®Janitrol Dura-tube

BETTER THAN CAST IRON! BETTER THAN STEEL!

Dura-tube is the one outstanding development in gas-fired warm air furnaces today! This new heat exchanger design with such amazing durability and performance gives you the industry's most powerful sales story. With Dura-tube, you have exclusive features the public can see, understand and appreciate . . . heating quality they can measure!

CONTRACTORS: Get all the facts on the powerful Dura-tube merchandising program. Write us about the territory you serve.

FASTER HEATING! The Dura-tube heats up quicker . . . responds faster to your automatic thermostat controls. [Janitrol heat is more even and economical.]

QUIETER! Heat-tempering takes out sounds of contraction or expansion. Extra-capacity blower is vibration cushioned. [Janitrol heating is restful.]

CLEANER! Air filters in your Janitrol have 40% more area than standard requirements. [A Janitrol home is cleaner . . . healthier.]

®Janitrol
HEATING AND AIR-CONDITIONING
DIVISION

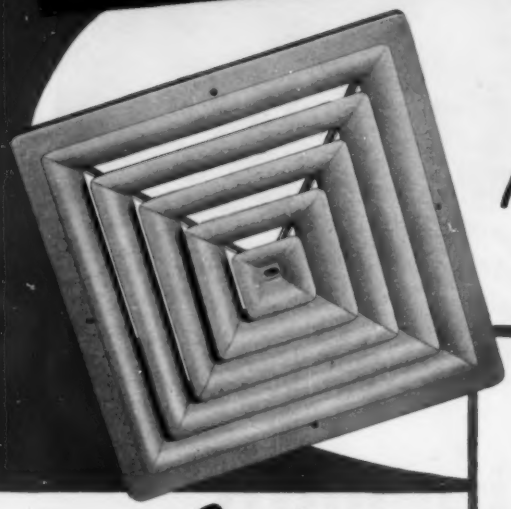
SURFACE COMBUSTION CORPORATION, COLUMBUS 16, OHIO
IN CANADA: ALVAR SIMPSON LTD., TORONTO 13.

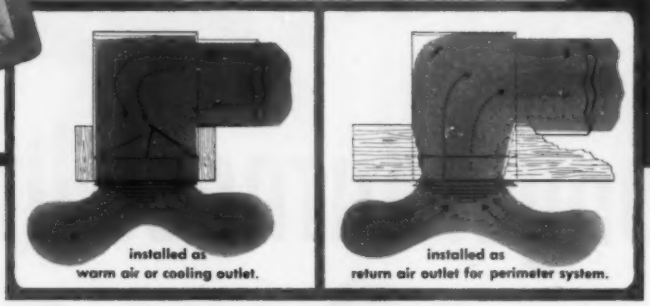
ADVERTISED IN The Saturday Evening POST

another *Lima* first

New Beauty for modern rooms

New Comfort all year 'round

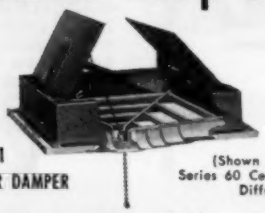




Series 60

new *Lima* SQUARE Step-Down Design CEILING DIFFUSER

for heating and cooling



Series 61
DIFFUSER DAMPER

(Shown with Series 60 Ceiling Diffuser)

Full center opening delivers air through center of damper, assuring more effective diffusion pattern. Full air shut-off. Lima "balancing bell" control feature simplifies balancing. Square design damper permits installation with blades parallel to pipe allowing maximum air flow.

Series 63
CEILING DIFFUSER
ADAPTER HEAD

Galvanized installation adapter is shipped knocked down — snaps together with buttonhole and dimple snap lock. Fits over damper frame so round or rectangular piping can be installed by tapping into top or either side of adapter.

Lima leads again with this new square design step-down ceiling diffuser. Attractively styled, the square design harmonizes with rectangular rooms and square block ceilings. Modern light beige actual finish eliminates need for repainting, unless desired.

Square design and tiers of step-down vanes provide greater free area for more effective air distribution with a minimum of resistance. Air is discharged outward and slightly downward in all directions at reasonably high velocity for complete 4-way diffusion without drafts. *Equally efficient for heating or cooling.*

Also recommended for return air outlets — especially in perimeter systems — eliminating large, unsightly grilles. Immediate delivery in six popular sizes. *See your local Lima jobber or write today for literature and prices.*

sold exclusively through heating wholesalers and manufacturers

Lima register company
LIMA, OHIO

See Us In Booth 74 at Philadelphia

WHAT THE ASSOCIATIONS ARE DOING

New York Group Completes Convention Plans

THE NEW YORK STATE Sheet Metal, Roofing & Air Conditioning Contractors' Association plans to hold its 32nd annual convention at the Mark Twain Hotel, Elmira, January 23 to 26. A number of outstanding speakers are scheduled to address the various sessions, including W. W. Woodroof, manager of cooling sales for American-Standard's Sunbeam Air Conditioner Div., who will discuss *The New Frontier for the Sheet Metal Contractor—Residential Air Conditioning;* F. R. House, welding engineer for Westinghouse Electric Corp., who will talk on *Welding in Sheet Metal;* and J. D. Stebbins, technical advisor for the Barrett Div., Allied Chemical & Dye Corp., whose talk will cover roofing and sheet metal work as it applies to built up roofing. J. D. Wilder, executive secretary, Sheet Metal Contractors' National Association, will report on activities of the national association, and A. J. Sabathne, past president of SMCNA and present chairman of the council, will discuss *Chapter Representation in Our National Association.*

There will be a roofing and sheet metal forum moderated by Ralph Straight and a heating and cooling forum with Douglas Mosteller acting as moderator.

D. L. Hayes will present a report on state compensation group No. 194, and safety committee reports will be given by William C. Schmitt, Jr., chairman, and John C. Kirkpatrick, co-chairman of the safety committee.

The annual meeting of the state association (for members only) will be held Wednesday, January 26, when reports will be heard from the auditing, resolutions and labor relations committees.

Joseph R. Stiglmeier, chairman of the apprenticeship committee, reports that the association's 1955 apprenticeship contest—awards for which will be presented at the annual convention—is now in full swing. The contest, which is open to first, second, third and fourth year apprentices, will close December 31, 1954. Each contestant should make his entry by sending his name and address—and the name and address of his employer—to the joint apprenticeship committee. Each local joint apprenticeship committee should file its intention to enter its apprentices in the contest by writing to Mr. Stiglmeier at 1188 Lovejoy St., Buffalo 6, N. Y., and asking for the required number of questionnaires and drawings of the fitting which is to be made by each contestant. Each local joint apprenticeship committee is requested to conduct a local contest among its apprentices, select one winning apprentice in each class, and mail the fitting made by the winning apprentice together with the drawing and explanation to the chairman not later than December 31 of this year.

NHWA Works on Convention Plans

THE NATIONAL HEATING Wholesalers Association, Inc. reports that plans for its annual convention, scheduled for January 20 to 22, 1955, are rapidly reaching completion. Based on suggestions received from members, the convention will be devoted entirely to business affairs. Subjects scheduled for discussion include merchandising, freight claims and adjustments, dealer management courses, multiple group insurance and accounting. Friday afternoon, January 21, will be devoted to a program which will provide information on the use of trade practice rules. The meeting will be conducted by representatives of the Federal Trade Commission, and an attorney selected by NHWA will be in attendance.

President Bill Bowe is planning to make this convention the largest in the association's history. He urges all members to make plans now to attend.

Talk Selling at Kalamazoo Meeting

PRINCIPAL SPEAKER at a recent meeting of the Kalamazoo Sheet Metal, Roofing, Heating & Air Conditioning Contractors' Association was Rex Paxton. Mr. Paxton, who is public relations director of Sutherland Paper Co., discussed *How to Sell More Heating Equipment in A Buyer's Market.* Officers for 1955 are: Jack VanDalson, president; Ray Wolfe, vice president; Richard Nipe, treasurer; and E. J. French, secretary.

New Committees for Carolinas Group

J. H. PIPER has been appointed by R. J. Barnes, president of the Carolinas Roofing and Sheet Metal Contractors' Association, to head the association's joint construction committee. W. R. Hartin has been named chairman of the membership committee. Other committee chairmen appointed by President Barnes include: W. H. Arthur, Jr., labor relations; V. D. Ramseur, Jr., supplier relations; W. T. Fort, convention; R. O. Pickens, sign and emblem; Bob Foster, warm air heating; Hilton Bowles, advisory; Sam Piper, sick and welfare; Earl DeLay, legislative; and Morris Apple, grievances.

WITH THE ASSOCIATIONS

(Continued)

New Members for Detroit Group

THE DETROIT WARM AIR Heating Association's November meeting was sponsored by the Gas Burner Distributing Co., Temperature Control, Inc., and Temp-Matic Wholesalers. Guest speakers were Charles Owen, assistant sales manager of the western division of the Janitrol Div., Surface Combustion Corp., who discussed *Price of Performance,* and L. H. Monahan, assistant sales manager of Janitrol's eastern division, who spoke on *Gas Fired Unit Heater Application.*

Reporting in a recent news letter on listings in the Michigan classified phone book, Jay Biddle, secretary of the group, states that the Michigan telephone company has suggested a way to eliminate a number of headings in the furnace category. He presents the results of a recent survey made by the company which indicates that a high percentage of the public, in looking in the classified book for a heating dealer, still use *furnace* as a finding word, and notes that so long as this situation exists, the telephone company will continue to use this heading. He suggests that contractors refrain from advertising on those pages containing the *furnace* categories and use the section devoted to "heating contractors."

(Other association news on page 122)

Coming Events

Jan. 20-22—National Heating Wholesalers Association, Inc., annual convention. Bellevue-Stratford Hotel, Philadelphia. C. Stuart Rambo, Executive Secretary, 228 N. LaSalle St., Chicago 1.

Jan. 23-26—New York State Sheet Metal, Roofing & Air Conditioning Contractors' Association, Inc., annual convention. Mark Twain Hotel, Elmira, N. Y. Clarence J. Meyer, Secretary, 567-69 Genesee St., Buffalo.

Jan. 24-27—American Society of Heating and Ventilating Engineers, 61st Annual Meeting. Bellevue-Stratford and Benjamin Franklin Hotels, Philadelphia. A. V. Hutchinson, Secretary, 62 Worth St., New York 13.

Jan. 24-28—International Heating and Ventilating Exposition—the Air Conditioning Exposition. Commercial Museum, Philadelphia. Managed by the International Exposition Co., 480 Lexington Ave., New York 17, and sponsored by the ASHVE.

Feb. 3-4—Sheet Metal & Warm Air Heating Contractors' Association of Indiana, annual convention. Hotel Severin, Indianapolis. Frank E. Anderson, Secretary, 439 S. 17th St., Terre Haute.

Feb. 10-12—Sheet Metal Contractors Association of Minnesota, annual convention. Hotel Lowry, St. Paul. H. T. Helle, Secretary, 531 Rice St., St. Paul 3.

Feb. 14-17—Fourth Annual Industrial Ventilation Conference. Kellogg Center, Michigan State College, East Lansing, Mich. James C. Barrett, Michigan State College, Lansing 4, Mich.

Feb. 24-25—Michigan Heating & Sheet Metal Association, annual convention. Bancroft Hotel, Saginaw. N. J. Biddle, Secretary, 3035 E. Grand Blvd., Detroit 2.

Feb. 28-Mar. 2—Ohio Sheet Metal Contractors' Association, annual convention. Sheraton-Gibson Hotel, Cincinnati. William C. Lumm, Secretary, 2512 Albion St., Toledo.

Mar. 7-9—Sheet Metal Contractors' Association of Wisconsin, annual convention. Hotel Schroeder, Milwaukee. Robert Schmieder, Secretary, 8320 W. Bluemound Rd., Milwaukee 13.

Mar. 25-26—Sheet Metal, Air Conditioning & Roofing Contractors' Association of Pennsylvania, annual convention. Brodhead Hotel, Beaver Falls. Earl W. Liebermann, Secretary, 1411 Merchant St., Ambridge, Pa.

Apr. 19-21—Oil-Heat Institute, annual convention. Conrad Hilton Hotel, Chicago. R. H. L. Becker, Managing Director, 500 5th Ave., New York 36.

Apr. 24-27—Sheet Metal Contractors Association of Illinois, Inc., annual convention. Pere Marquette Hotel, Peoria. Jay E. Harms, Secretary, 1619 N. Sheridan Rd., Peoria.

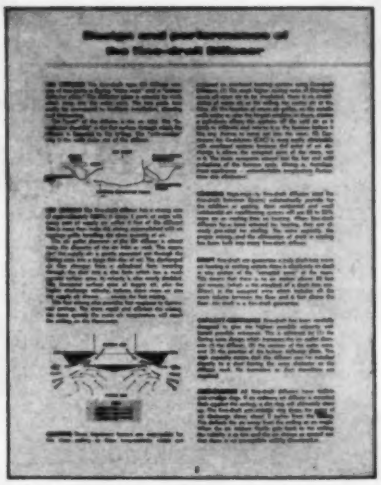
Apr. 27-30—Sheet Metal Contractors' National Association, annual convention. Mark Hopkins Hotel, San Francisco. J. D. Wilder, Executive Secretary, 170 Division St., Elgin, Ill.

INSIDE STORY

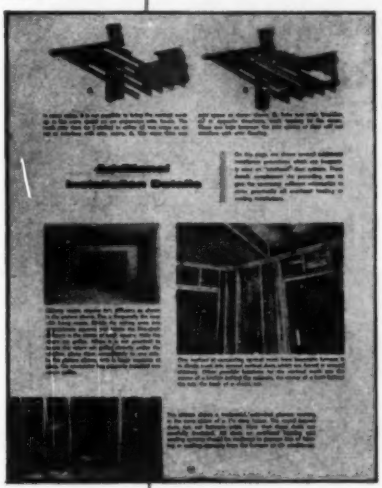
of the "hottest" profit idea in home heating and cooling

Told in new Connor bulletin. Sample pages reproduced in miniature below.

NEW BULLETIN TELLS ALL about Kno-Draft. See table of contents on cover above.



YOU CAN SEE enough in these miniature reproductions of sample pages—five out of sixteen—to indicate scope and style of this Kno-Draft presentation.



INSTALLATION DETAILS are shown step by step in easy-to-follow pictures and diagrams. This Kno-Draft bulletin is a "must" for your files.

CONTRACTORS and builders are making steady, tidy profits with Kno-Draft Overhead Air Diffusers. Here's perfect heating and cooling comfort—no drafts, no blasts, always even temperature. And home owners "go for" its cleanliness and the freedom it gives in furniture placement.

Kno-Draft gives you more to offer—takes you out of price competition. It's easy to install—is ideal for stores, offices and other small commercial installations as well as for homes. And it's just as efficient for cooling as for heating.

New Bulletin KH-76 "sampled" in the pictures here, gives the full Kno-Draft story—what it is, how it works, how it's installed. *Mail that coupon today for your free copy!* Connor Engineering Corporation, Danbury, Connecticut.

kno·draft®
residential air diffusers

WANT THAT BULLETIN KH-76!

CONNOR ENGINEERING CORP.
Dept. I-124, Danbury, Connecticut

RUSH me my free copy of your new 16-page Kno-Draft Bulletin.

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Position_____

Company_____

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City_____ **Zone**_____ **State**_____

HERE'S A REALLY
Quiet
GAS
VALVE
Two wire, direct-acting relay
Self-aligning, full-floating valve disc with flannel-backed Buna-N disc assures positive gas shut-off
Electrical leads sealed in on insulated block
Vertical, self-cleaning stainless steel seat
Straight-through gas flow

HERE AT LAST is a compact, dependable, efficient gas valve that eliminates slam-bang operation. It's entirely new in design, with years ahead features. Try the new Penn Series 926 and you'll agree it's the best gas valve on the market; built in ¼", ⅜", ½" and ¾" sizes for low or high voltage applications. Get the full story, write **Penn Controls, Inc., Goshen, Indiana.** Export Division: 13 E. 40th Street, New York 16, N. Y., U. S. A. In Canada: Penn Controls Limited, Toronto, Ontario.

PENN

AUTOMATIC CONTROLS

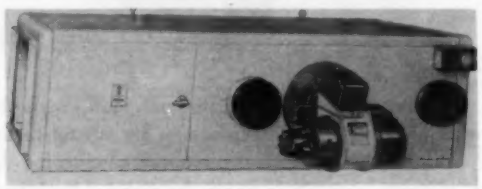
FOR HEATING, REFRIGERATION, AIR CONDITIONING, GAS APPLIANCES, PUMPS, AIR COMPRESSORS, ENGINES

EQUIPMENT DEVELOPMENTS

The latest information on manufacturers' developments is presented here with brief summaries of the applications of these products. For additional product information which is available, see this month's New Literature department.

Horizontal Oil Fired Furnaces

MODELS OS-84E AND OS-112E horizontal oil fired furnaces with bonnet output of 84,000 and 112,000 Btu per hour — International Heater Co., 101 Park Ave., Utica 2, N. Y. Furnaces are 20 in. high. Burner controls, observation and cleanout doors, blower access door and flue outlet are all on one side,



with an alternate flue outlet on the back. The filters are removable through blower access door and there is adequate external static pressure to operate on small pipe systems, according to the manufacturer. Warm air discharge can be changed from right to left by inverting the unit and rearranging the burner and observation door.

Insulated Skylight

"DUBL-DOME" vacuum insulated skylight designed to eliminate moisture condensation and said to give greatly improved insulation protection — Bettcher Plastics Co., 1604 S.W. 10th Ave., Portland 1, Ore. A permanently sealed vacuum between upper and lower

domes restricts noises, dust or dirt. A flat soft glass sheet compensates the compressive forces of the outer domes and stabilizes the form. The one-piece skylight can be installed on roof slopes up to 30 deg, the manufacturer states. Ten sizes are available, equipped for installation.

Industrial Space Heater

FORTY-EIGHT MODELS ranging from 400,000 to 2,000,000 Btu capacity for industrial applications — Auto-Therm Manufacturing Co., 19003 John R, Detroit 3. Using either gas or oil as fuel, the stainless steel heat exchanger is designed to give a minimum operating efficiency of 80 percent, the manufacturer states. Flue gases are directed through the heat exchanger in four passes by use of stainless steel and refractory baffles. Three large blowers, operating at low speed, deliver heated air to the four distributor heads located on the top of the heater. The adjustment of each distributor head is individually operated for maximum air distribution.

Air Cooled Air Conditioning Unit

"SHANA-AIR" horizontal summer cooling unit containing cooling coil, condensing unit and air cooled condenser for attic and crawlspace installations — Shana Manufacturing Inc., 188 W. Randolph St., Chicago. Outside air is supplied to the condenser through round ducts; heated air is discharged at a distance

location, also through round ductwork. The 1½ ton capacity air cooled unit is part of the 1955 line which also includes 2, 3 and 5 ton water cooled and air cooled packaged units ready for installation with the companion oil and gas fired furnace line soon to be announced by the company.

Quick-Lock Chimney Housing

CHIMNEY HOUSING with quick-lock corners designed to replace corner angle irons — Van-Packer Corp., 209 S. La Salle St., Chicago 4. After measuring and cutting for correct height and pitch to encase the above-roof portion of the completed chimney flue, panels are assembled by sliding one quick-lock corner into its mate on the adjacent panel. Completed housing is fastened to the roof around the flue by wooden bracing cleats. Embossed red brick texture and natural color mortar lines of cement-asbestos panels give the appearance of a brick chimney.

Baseboard Perimeter Diffuser

No. 180 baseboard perimeter diffuser featuring a new base design which permits installation before or after plastering on subfloor or finished floor — Air Control Products Inc., Coopersville, Mich. Front face is re-

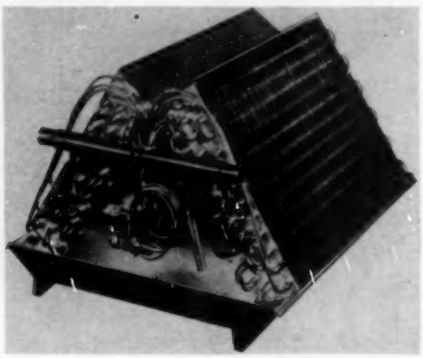
movable. Increased free areas of 29.36 sq in. on the four ft size and 14.68 sq in. on the two ft size are said to provide less resistance. Knock-out strips on the larger model speed installation of diffuser to fittings; smaller model has pre-cut hole for 12 in. fitting and knock-outs for 14 in. fitting.

Silver Brazing Alloy for 400 Series

"RSNI" SILVER BRAZING ALLOY developed to overcome crevice corrosion in brazing the 400 series straight chromium stainless steels — Handy & Harman, 82 Fulton St., New York 38. The new alloy is 63 percent silver, 28.5 percent copper, 6 percent tin and 2.5 percent nickel. It melts at 1325F, flows at 1475F, and does not flatten to form thin fillet edges at brazing temperature. The alloy is available in wire of any standard gage.

Year 'Round Air Conditioner

"SPACESAVER" year round residential air conditioning combination — Airtemp Div., Chrysler Corp., 1600 Webster St., Dayton 1. Incorporated as part of the furnace assembly, a "V" type cooling coil requires 14½ in. additional height. Complete heating-



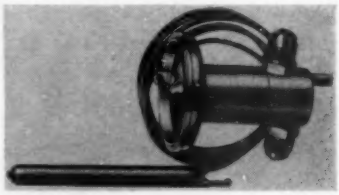
cooling system includes the new V-coil in four models, condensing unit and a lowboy or highboy furnace. Seamless copper tubing pipes refrigerant between the coil and the condenser, which can be located outdoors, in the garage or in a crawl space or basement. The furnace blower is used for both summer and winter applications. The V-coil is also available separately, and is adaptable to other forced warm air furnaces having adequate blower capacity.

Gas Fired Furnaces

"IMPERIAL" FORCED AIR gas fired furnaces featuring a special porcelain enamel heating element — Payne Furnace Div., Affiliated Gas Equipment, Inc., 700 Royal Oaks Dr., Monrovia, Calif. Styled in two-tone sand and charcoal grey, the furnaces are finished in gold trim. Models are available in 75,000, 100,000, 135,000 and 170,000 Btu inputs.

Compressor Capacity Modulating Valve

MODEL 521 thermostatic modulating valve, a temperature actuated metering valve designed to operate as a compressor unloading device — A-P Controls Corp., 2450 N. 32nd St., Milwaukee 45. Installed in a bypass line between refrigerating system compressor and the system's low side, the valve allows refrigerant to bypass the condenser and expansion valve in response to



the temperature at the valve thermal bulb. With the thermal bulb installed in the return air stream to the evaporator or clamped to the evaporator coil, the degree of valve opening increases as thermal bulb temperature declines. An increased quantity of refrigerant is then bypassed directly from the high side of the system to the low side. As the quantity of refrigerant bypassed increases, machine capacity is sufficiently reduced to match system heat load and to maintain a constant temperature of evaporator leaving air. Equipment capacity is therefore automatically balanced out against the heat load to maintain constant temperature conditions in the air conditioned space. Liquid charged power element permits mounting the valve in any position, in any ambient temperature, the company states.

Gas Conversion Burners

TWO MONOPORT gas burners designed for conversion use and as original equipment — Barber Gas Burner Co., 3708 Superior Ave., Cleveland. Model SNG1-A, for conversion application in residences, is rated

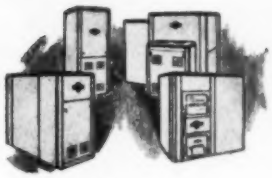
for natural or mixed gas from 65,000 to 185,000 Btu input and for LP gas from 75,000 to 105,000 Btu input. In most conversions from oil the combustion chamber need not be altered, the manufacturer states. Consisting of a pressed steel venturi enclosed in a blast tube, the burner has automatic controls. The "V" line is offered with or without controls, in ranges

(This article continued on page 124)

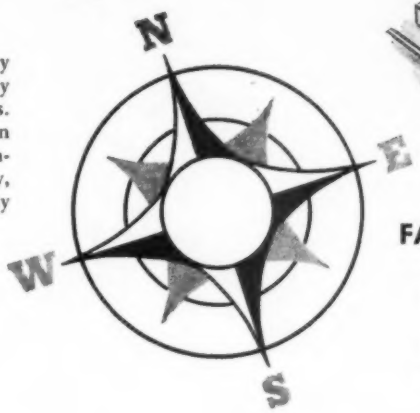
it takes all four . . .

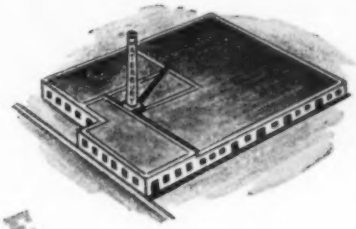
TO GIVE DEALER SATISFACTION

PRODUCT . . . Every Waterbury furnace, air conditioner and gas conversion burner must meet the highest standards in warm air heating equipment. This is in line with the belief that "It's what's *under* the casing that counts!"



POLICY . . . Waterman-Waterbury maintains a clearly-stated policy towards dealers and distributors. It includes exclusive distribution rights, a close, personal relationship between dealers and factory, and a complete line of quality equipment.

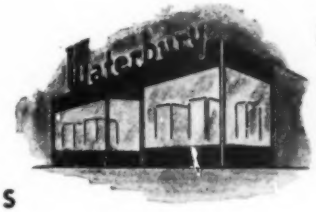




FACTORY . . . For over 47 years, the Waterman-Waterbury Company factory has combined the finest efforts of skilled craftsmen and experts in heating. The result has been continuing customer satisfaction with Waterbury.

Waterbury

FURNACES AND WINTER AIR CONDITIONERS



MARKET... National advertising and the testimony of satisfied customers give prospective customers confidence in Waterbury. Effective merchandising and local advertising help these prospects become satisfied customers.

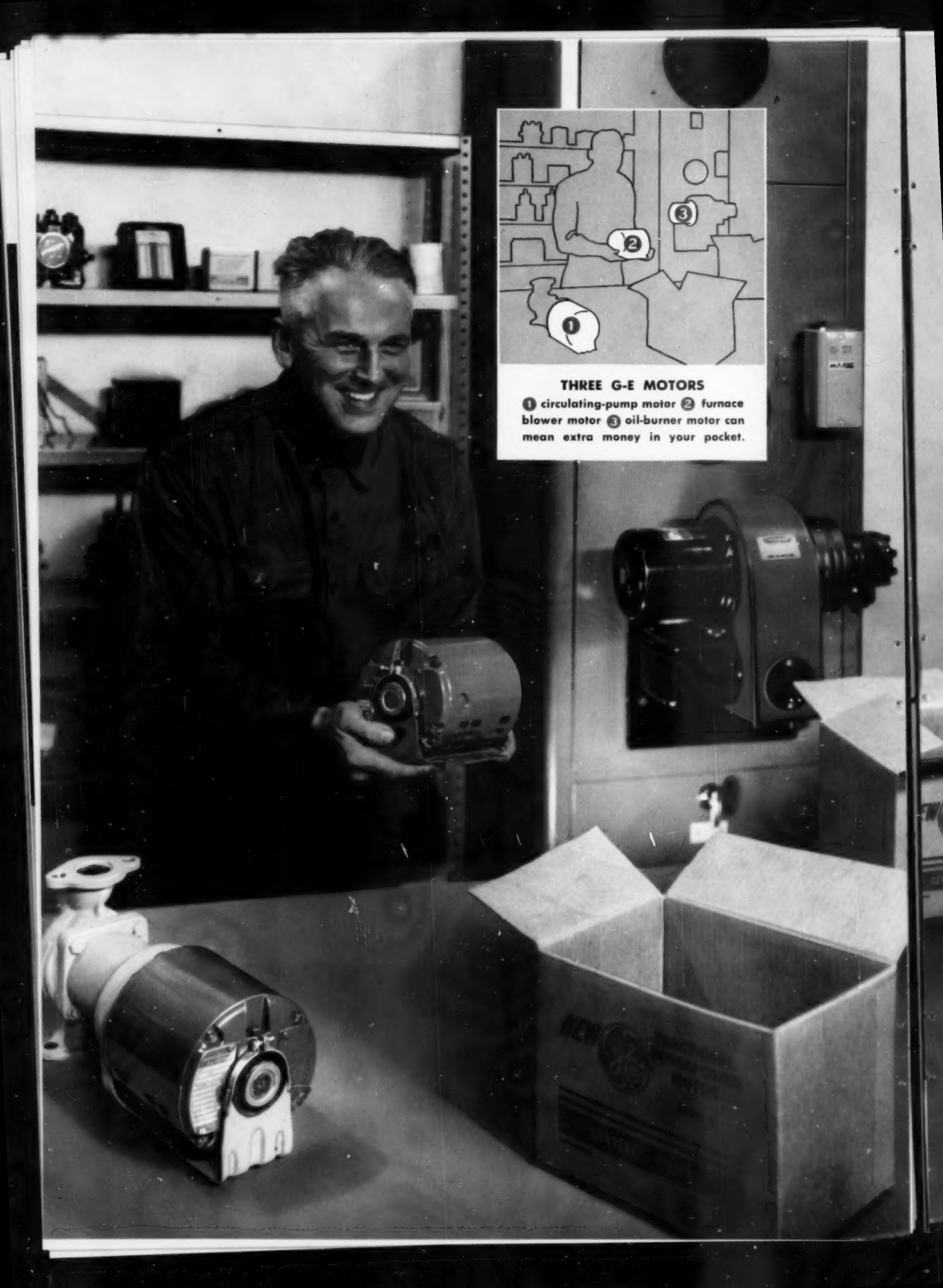
Dealers at all points of the compass find that association with Waterbury is good business. Their satisfaction is based on a number of reasons, including the four given here. Waterbury dealers know that Waterbury is the right line, with the right policy for them.

SEE YOU AT THE SHOW! We'll be in Booth 114 during the 12th International Heating & Ventilating—Air Conditioning Exposition in Philadelphia, January 24th to 28th. Stop in!

The Waterman-Waterbury Co.

OVER 47 YEARS OF WARM AIR HEATING

1122 JACKSON ST., N.E. ♦ ♦ ♦ MINNEAPOLIS 13, MINNESOTA



THREE G-E MOTORS

❶ circulating-pump motor ❷ furnace blower motor ❸ oil-burner motor can mean extra money in your pocket.

You Profit Four Ways When G-E Motors Are Installed on Heating Equipment You Sell

1 **G-E MOTORS HELP YOU SELL.** Prospects instantly recognize the G-E monogram as a symbol of reliability. Take advantage of this unmatched customer acceptance by pointing out that your equipment is powered by G.E. — leading manufacturer of motors for heating equipment. You'll find it helps close sales.

2 **THEY KEEP CUSTOMERS SOLD.** G-E engineers even run special under-water tests to prove that superior G-E insulation will provide maximum life in damp basements. Unique design which doubles lubrication life is one more G-E feature which contributes to dependability and customer satisfaction.

3 **THEY INSTALL EASIER, FASTER.** G-E motors are smaller and up-to-50% lighter than other motors — for easier installation in limited space. Rotation of burner and fan motors can be reversed by changing two easy-to-reach leads. Welded-on speed nut simplifies conduit connection. You save on installation.

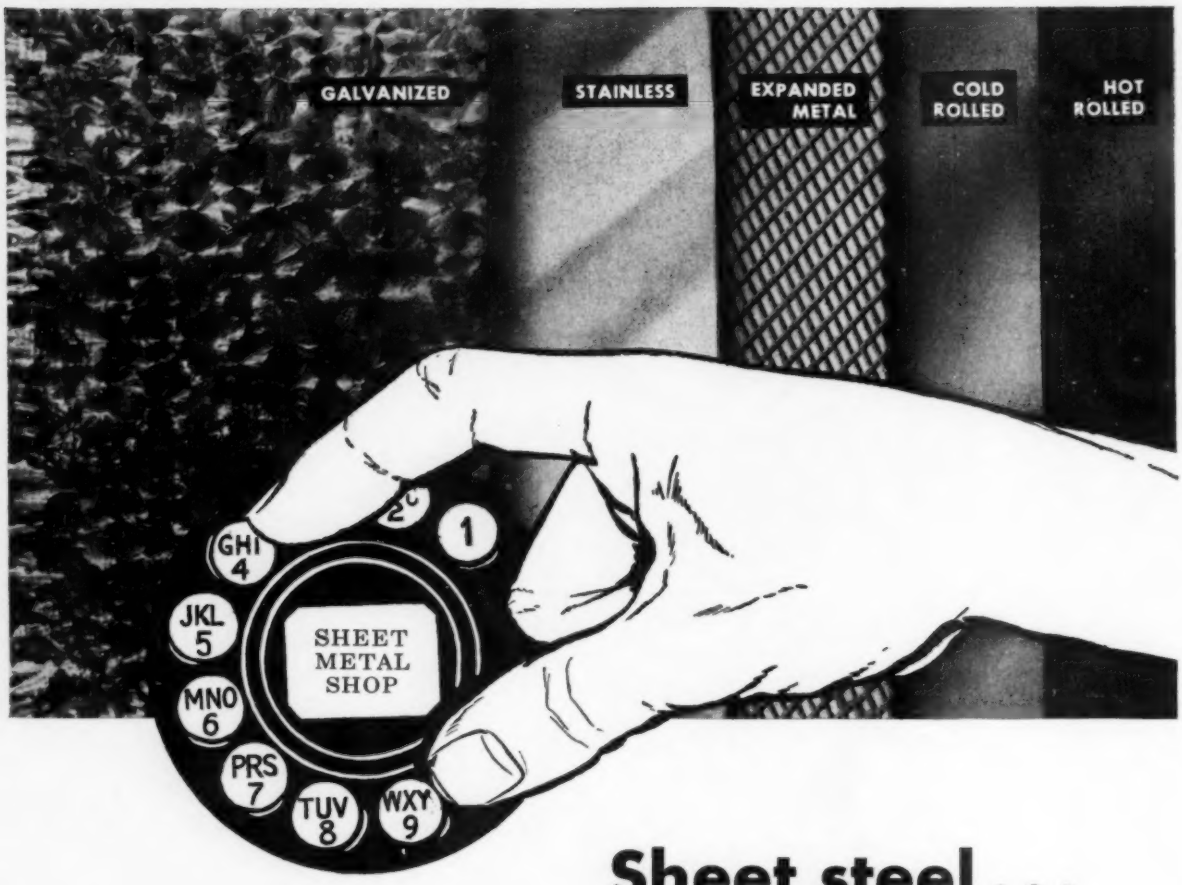
4 **THEY'RE BACKED BY LOCAL SERVICE.** To provide prompt, efficient service for your customers, every major area has a G-E Small Motor Service Station.

In all, these are four profitable reasons for suggesting that your suppliers power their products with G-E motors. General Electric Co., Schenectady, N.Y.

701-13

Progress Is Our Most Important Product

GENERAL ELECTRIC



Sheet steel . . .

world's largest stocks at your finger tips

Specify the sheets you need—galvanized, carbon steel, expanded metal, stainless—any of more than 20 types. Then call your nearby Ryerson plant. There you will find a wide range of gauges and many pattern sizes in every type. One call brings immediate delivery of a single sheet or a truckload from these world's largest stocks.

Ryerson galvanized sheets are pleasing in appearance—bright and clean with uniform spangle. Form readily without flaking or peeling. Workable Ryerson Allegheny stainless is ideal for flue liners and other sheet metal shop jobs. Ryex expanded metal is available in two types, standard and flattened, both types with all sharp edges positively removed.

If you have a particularly tough steel problem, our sheet metal specialists will be glad to work with you to solve it. So when you need steel or help on steel problems, call your nearby Ryerson plant.

GUARANTEED MACHINERY AND TOOLS

We unreservedly guarantee every machine—every tool we sell to be as represented and of first class material and workmanship. This means you can be sure of complete satisfaction no matter what metal-working equipment you need. Every type is available through your nearby Ryerson plant. And we are specialists in machinery and tools for sheet metal fabrication.

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editorial

The Air Conditioning Boom

Ever-increasing public and builder acceptance of residential air conditioning, the popularity of warm air heating, continued high levels of home construction (forecast last month by government and other sources), the ease of financing modernization of older homes, and our rising living standards — all point to a rapidly upward sales curve for cooling installations. While some over-optimism on the part of appliance dealers, department stores, "discount houses" and others in 1954 led to disappointments regarding increases in the volume of sales of plug-in air conditioners, central residential cooling jobs continued to increase at a very healthy rate. And we believe that 1954 sales of room air conditioners, too, made through logical channels of distribution — such as the warm air heating-residential air conditioning dealer — compared favorably with the figures for previous years.

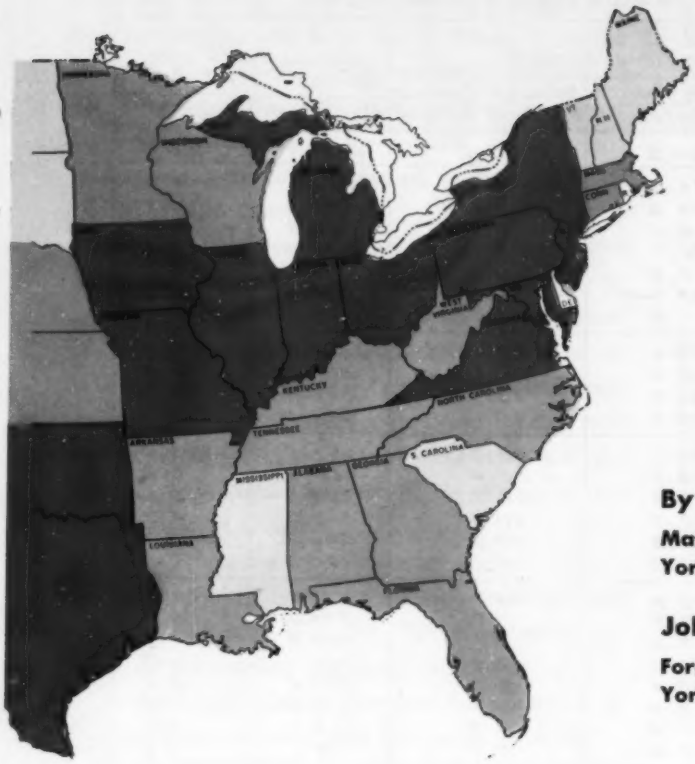
The central cooling plant for the home, together with the central warm air heating installation, is the currently "hot" air conditioning application. A round-up of informed opinion of authorities in the air conditioning industry on the dollarwise expectations for volume of this work leads to a figure of $1,155,000,000 in 1958 and $1,750,000,000 in 1963 for central cooling jobs in homes. These dollar figures compare with the $100,000,000 estimated to be the total for 1953.

Warm air heating dealers — the great number now doing home cooling, and those planning to enter this phase of their work — occupy the commanding position in the development of this big business.

Now That Where Will

• Residential air conditioning is a big market that's getting bigger. It's accepted as a boom development, with a precipitously upward sales curve for the next decade.

• For intelligent sales planning, efficient coordination of sales efforts, and the sound growth of residential air conditioning, it is necessary to analyze the market and establish sales quotas.



By V. T. Kartorie
Manager of Market Research
York Corp.

John R. Hertzler
Formerly Vice President and General Sales Manager
York Corp.

The "BOOM" Is Here— Air Conditioning Be Sold?

• Purchase of a residential air conditioning system depends not only on population, income, etc. but on other factors, too — such as the climate and type of heating already in use.

• Here's an analysis . . . . the only one of its kind . . . . that recognizes these various factors, outlines the residential air conditioning market, and shows the percentage of the total represented by each state.

AIR CONDITIONING as applied to residences finds a fertile market in the conversion of forced warm air heating systems to year 'round air conditioning systems by the addition of summer cooling and dehumidification circuits. Houses with "wet heat," furnished with direct radiation or panel heating, also constitute a part of the market — so also do houses, particularly in southern locations, which have no central heating at all.

When it is considered that in 1950, one half of all dwelling units in the United States did not have central heating, this portion of the market looms in greater importance as a contributor to the potential for year 'round residential air condition-

TABLE 1 - YEAR-ROUND RESIDENTIAL Air Conditioning Market In Occupied One-Family Structures (Reported In Thousands, Corrected For Climatic Factor)

Sections and States	1. Type Of Heating System: Warm Air	2. Type Of Heating System: Steam or Hot Water	3. Type Of Heating System: Without Central Heating System[2]	4. Totals Columns 1+2+3: Number	5. Totals Columns 1+2+3: % U.S.
TOTAL U.S.	3691.0	1830.3	1041.8[2]	6563.1	100.0
NEW ENGLAND	93.7	194.5	14.9	303.1	4.6
Connecticut	35.8	56.6	5.4	97.3	1.4
Maine	5.9	4.0	0.3	10.2	0.2
Massachusetts	41.0	104.7	7.3	153.0	2.3
New Hampshire	3.6	3.5	0.2	7.3	0.1
Rhode Island	4.9	23.9	1.6	30.4	0.5
Vermont	3.0	1.8	0.1	4.9	0.1
MIDDLE ATLANTIC	652.0	798.4	57.4	1507.8	22.9
New Jersey	99.9	207.0	14.4	321.3	4.9
New York	213.7	282.9	22.9	519.5	7.9
Pennsylvania	338.4	308.5	20.1	667.0	10.1
EAST NORTH CENTRAL	1272.7	256.1	108.7	1637.5	25.0
Illinois	300.3	108.7	31.4	440.4	6.8
Indiana	203.0	22.4	12.7	238.1	3.6
Michigan	243.3	47.9	20.8	312.0	4.7
Ohio	416.1	54.8	35.3	506.2	7.7
Wisconsin	110.0	22.3	8.5	140.8	2.2
WEST NORTH CENTRAL	615.9	110.8	44.7	771.4	11.7
Iowa	175.9	22.9	10.0	208.8	3.2
Kansas	96.7	7.6	6.1	112.4	1.7
Minnesota	77.6	26.6	7.9	112.1	1.7
Missouri	177.0	39.4	16.0	232.4	3.5
Nebraska	67.3	8.5	3.7	79.5	1.2
North Dakota	6.4	1.4	0.3	8.1	0.2
South Dakota	15.0	2.4	0.7	18.1	0.2
SOUTH ATLANTIC	405.7	309.8	301.3	1016.8	15.5
Delaware	15.1	11.9	9.2	36.2	0.6
Dist. of Col.	8.4	39.5	20.5	68.4	1.0
Florida	29.4	10.5	71.5	111.4	1.7
Georgia	59.5	12.7	32.1	104.3	1.6
Maryland	84.7	113.7	50.9	249.3	3.8
North Carolina	63.1	23.9	32.8	119.8	1.9
South Carolina	20.5	6.2	16.7	43.4	0.6
Virginia	70.5	76.3	48.4	195.2	3.0
West Virginia	54.5	15.1	19.2	88.8	1.3
EAST SOUTH CENTRAL	209.6	49.9	115.9	375.4	5.8
Alabama	44.2	8.7	29.0	81.9	1.3
Kentucky	78.1	15.0	31.2	124.3	1.9
Mississippi	18.0	8.1	16.2	42.3	0.6
Tennessee	69.3	18.1	39.5	126.9	2.0
WEST SOUTH CENTRAL	221.4	85.7	328.7	635.8	9.6
Arkansas	27.1	8.3	22.1	57.5	0.8
Louisiana	29.2	14.5	60.1	103.8	1.6
Oklahoma	63.7	9.9	42.4	116.0	1.8
Texas	101.4	53.0	204.1	358.5	5.4
MOUNTAIN	37.7	5.9	9.9	53.5	0.9
Arizona	12.8	2.1	4.4	19.3	0.2
Colorado	9.0	1.6	2.0	12.6	0.2
Idaho	2.8	0.3	0.6	3.7	0.1
Montana	3.2	0.5	0.5	4.2	0.1
Nevada	0.5	0.1	0.2	0.8	—
New Mexico	3.3	0.5	0.8	4.6	0.1
Utah	4.7	0.5	1.1	6.3	0.1
Wyoming	1.4	0.3	0.3	2.0	0.1
PACIFIC	182.3	19.2	60.3	261.8	4.0
California	149.7	15.4	51.2	216.3	3.3
Oregon	14.4	1.2	3.9	19.5	0.3
Washington	18.2	2.6	5.2	26.0	0.4

NOTES:

1. Limited to dwellings having value $ 7500 and over.
2. Rural farm not available and not included; number of structures estimated to be less than 15,000.

SOURCES:

1950 Census of Housing, Volume I, Part 1, General Characteristics, Table 21, page 1-31 to 1-35; and special tabulations prepared for "AMERICAN ARTISAN" published in "How America's Homes Are Heated", Copyright 1954.

ing sales. This, in part, explains the boom which has been experienced in the southern states in residential air conditioning, where, prompted by an eight month summer air conditioning season versus a four month winter heating season, many houses are being air conditioned, even though they lacked central heat.

Table 1 is the result of considerable analysis of sales records and basic criteria. It tabulates in one spot each state's share of the total year 'round residential air conditioning market. It is based on a sample of 13 ¾ million occupied dwelling units in one-family structures as reported in the 1950 Census of Housing compiled by the Bureau of the Census, and located in each of the 48 states and the District of Columbia.

The calculation of each state's share of the national market for year 'round residential air conditioning sales is made. The component portions of the market, calculated separately, are:

1) Structures with gravity and forced warm air heating systems using coal, gas or oil as fuels.

2) Structures with steam or hot water heating systems using coal, gas or oil as fuels.

3) Structures without central heating systems and over $7500 value each.

Thus, a manufacturer, distributor or dealer of equipment applicable only to existing warm air systems could use the first portion of Table 1 in setting state quotas for the sale of his equipment.

Those furnishing appurtenances applicable only to "wet heat" systems could use the second section of Table 1 upon which to predicate sales by state.

Those making equipment applicable to new homes and to all types of existing heating systems ("wet heat" as well as to warm air) should use the total potential figures for each state as developed by Table 1.

Similarly, a manufacturer, distributor or dealer supplying equipment to only a part of the United States can develop relative sales potentials by using only the absolute values tabulated for each of the states which he considers as covered by his distribution system.

Supporting the development of the state potentials as indicated in Table 1 are the studies developed in detail in Table 2 and the trends analyzed in Figs. 1, 2 and 3, which include a comparison of the effect of heating system trends from 1940 to 1950. We suggest this background material be analyzed in sequence to secure a comprehensive understanding of where the market for the sale of year 'round residential air conditioning systems lies.

Here's Brief Explanation of Climatic Factors

In the tables and data published in this article, a summer climatic factor is applied to show the relative market potentials. This summer climatic factor is based on the severity of the summer weather. It is used to multiply the numbers of dwelling units only to arrive at the *relative* air conditioning potentials of the various states. In other words, multiplying the climatic factor and the number of dwelling units does not result in the absolute potential; it establishes the relative state distribution of the potential as it is affected by climate alone.

As mentioned, the summer climatic factor represents the severity and duration of the weather when cooling is needed. Florida, for example, has a summer factor of unity (1.000). Table 2 also shows — for reference only — heating climatic factors, which are a measure of the severity of winter weather. In this case North Dakota has a value of 1.000.

— The Editors

A Basis for Market Evaluation

As the acceptance of comfort air conditioning becomes more general, it is possible to analyze the long term trends and the progress in the respective types of equipment. Air conditioning equipment can be thought of as broken into four classifications:

1) Room air conditioners.

2) Self contained air conditioners 2 hp and above.

3) Remote type systems.

4) Central residential air conditioning systems, including the heat pump for year 'round residential air conditioning.

The authors have developed a series of climatic factors which can be applied against base statistical information to correct for the effect of climate on the use of summer air conditioning equipment. Since 1949 the relative territory development in the use of commercial air conditioning equipment has been measured accurately by retail sales distribution throughout the respective trading areas corrected for climatic factor per reference 1, which appeared in

"Climate, the desire for comfort, and the social characteristics of the buyer and his family are motivating forces in the purchase of air conditioning which have an important bearing on sales possibilities."

Heating, Piping & Air Conditioning in the May, June and July 1953 issues.

The distribution of room air conditioners to date has pretty well followed retail sales corrected for the summer climatic factor.

Self contained air conditioners, 2 hp and above, have likewise followed retail sales distribution throughout the trading areas corrected for the summer climatic factor.

Similarly, the same experience applies to remote systems which are installed almost without exception in large commercial buildings as a part of plan and specification work handled through the route of the architect, mechanical engineer, mechanical contractor, and building trades. The relative development of remote air conditioning systems, annually and cumulatively over the years, has been measured against population, disposable income, and retail sales, and a combination of these factors. Regardless of the base used to measure relative territory potentials, climate still has an important effect on the development of this class of business, and consequently, the use of a climatic factor as developed in reference 1 has been quite effective.

Central Systems Need Engineering

There has been an early indication that the year 'round residential air conditioning systems are not as adaptable to straight merchandising techniques as is the distribution of room air conditioners. More engineering is involved with respect to application, more components must be fitted to a house to meet particular requirements of the individual residence, its occupants and owners, and by and large, more service will be demanded by house owners after the installation has been made.

It has also been evident that mortgage financing applicable to this type of built-in system must take into account the long range operating cost in order to make the systems eligible for mortgage financing guaranteed by the Federal Housing Administration.

The mass builders have also shown a great interest in integrated year 'round air conditioning built into new housing, inasmuch as there have been indications that the demand for new housing will not keep up in the long run with the capacity of the construction industry to build dwelling units.

Significance of 1950 Housing Census

The information compiled as a part of the 1950 Census of Housing makes it possible to refine the various criteria which can be used to develop a long range market analysis of the potential for the sale of residential air conditioning systems.

This census is significant and of great importance.

1. It separates apartment dwelling units from those in separate and detached structures.

2. It separates farm dwelling units in such a manner as to indicate their relatively small effect, leading to the conclusion that farms should be contained in the basic factors used to measure the potential for residential air conditioning system sales.

3. The 1950 Census of Housing separates both dwelling units and single family structures which have and which do not have central heating.

4. The census distinguishes between existing warm air systems and existing "wet heat" systems.

5. The census distinguishes between the fuels used by dwellings furnished with central heating, separating those using coal from those which use oil or gas.

6. The 1950 Census of Housing indicates by groups the dollar value of the dwelling units, which in the case of the single family dwelling units is of great signicance in measuring the potential development for the sale of year 'round residential air conditioning systems. This becomes evident when it is realized that only half of the dwelling units in the United States, as covered by the census, actually have central heating. Very frequently the statement has been made that some day owners of houses will buy cooling as an essential part of a house, just as they

today consider it necessary to have heating. Well, actually only half of the houses have central heating, which is most significant.

7. The 1950 Census of Housing reveals the trends that have taken place in the development of housing during the preceding decade.

It is our intention to analyze the respective data made available through the 1950 Census of Housing regionally, and ultimately develop the basic facts for the 48 states and the District of Columbia.

How America's Homes Are Heated

A most valuable contribution has been made recently by the American Artisan, which arranged with the Bureau of the Census for special tabulations of 1950 census data which would show the distribution pattern of single family dwellings, other than single family dwellings, and types of fuels as related to kinds of heating systems. The results are published in a 60-page brochure, identified in reference 4, which are utilized extensively in this analysis.

In references 2 and 3, the authors compiled various information from the 1950 Census of Housing and analyzed it regionally for the purpose of showing that the definition of a dwelling unit is so broad, that while it might be very effective in measuring the potential for and the distribution of electric ranges and other appliances, it is not adequate for measuring the potential for the sale of year 'round residential air conditioning systems. To make this point clear, we quote the following excerpts from the 1950 Census of Housing:

> "In general, a dwelling unit is a group of rooms or a single room occupied or intended for occupancy as separate living quarters by a family or other group of persons living together or by a person living alone."
>
> "Ordinarily a dwelling unit is a house, an apartment or a flat. A dwelling unit may be located in a structure devoted to business or other non-residential use, ..."
>
> "A group of rooms occupied or intended for occupancy as separate living quarters is a dwelling unit if it has separate cooking equipment, or a separate entrance. A single room occupied, or intended for occupancy as separate living quarters, is a dwelling unit if it has separate cooking equipment or if it constitutes the only living quarters in the structure. Each apartment in a regular aparment house is a dwelling unit even though it may not have separate cooking equipment. Apartments in residential hotels are dwelling units if they have separate cooking equipment or consist of two rooms or more."

Even though under the above definition of a dwelling unit there are 45,983,398 such dwelling units (of which 39,625,455 are urban and rural non-farm dwelling units), the first stopper is the fact that in 1950, only 50.4 percent of the total dwelling units had central heating; 26.9 percent with warm air, and 23.5 percent wet heat systems. Of the total of all dwelling units, there were 29,115,698 single family dwelling units in separate and detached structures, which demonstrates the concentration of apartments in the Middle Atlantic region, embracing the states of New Jersey, New York, and Pennsylvania. The apartment dwelling unit does not represent a good prospect for the installation of a central year 'round residential heating and cooling plant.

Facts About One Family Structures

Consequently, the major tabulation of basic facts for the determination of the potential for the sale of year 'round residential systems, Table 2, has been developed to cover only occupied dwellings in one-family structures.

At the top of Table 2, the total U. S. figures are indicated, separating the urban and rural non-farm dwellings from the rural-farm dwelling units. Thus, from column 4, the farm dwelling units constitute not quite 20 percent of the total. Throughout the analysis their effect is so small that for the purpose of this study farm dwelling units are included in all absolute values compiled on a national scale. There is no reason why the year 'round residential air conditioning business cannot be developed in rural and farm areas in farm dwelling units as well as in urban areas.

Basic in the analysis, in columns 1 and 2, are the cooling climatic factors as developed by Reference 1, and the heating climatic factor, which is a measure of annual degree-days showing each state's relative number of degree-days in percent of the degree-days experienced by the state of North Dakota, the cold-

TABLE 2 – TOTAL OCCUPIED DWELLINGS in One-Family

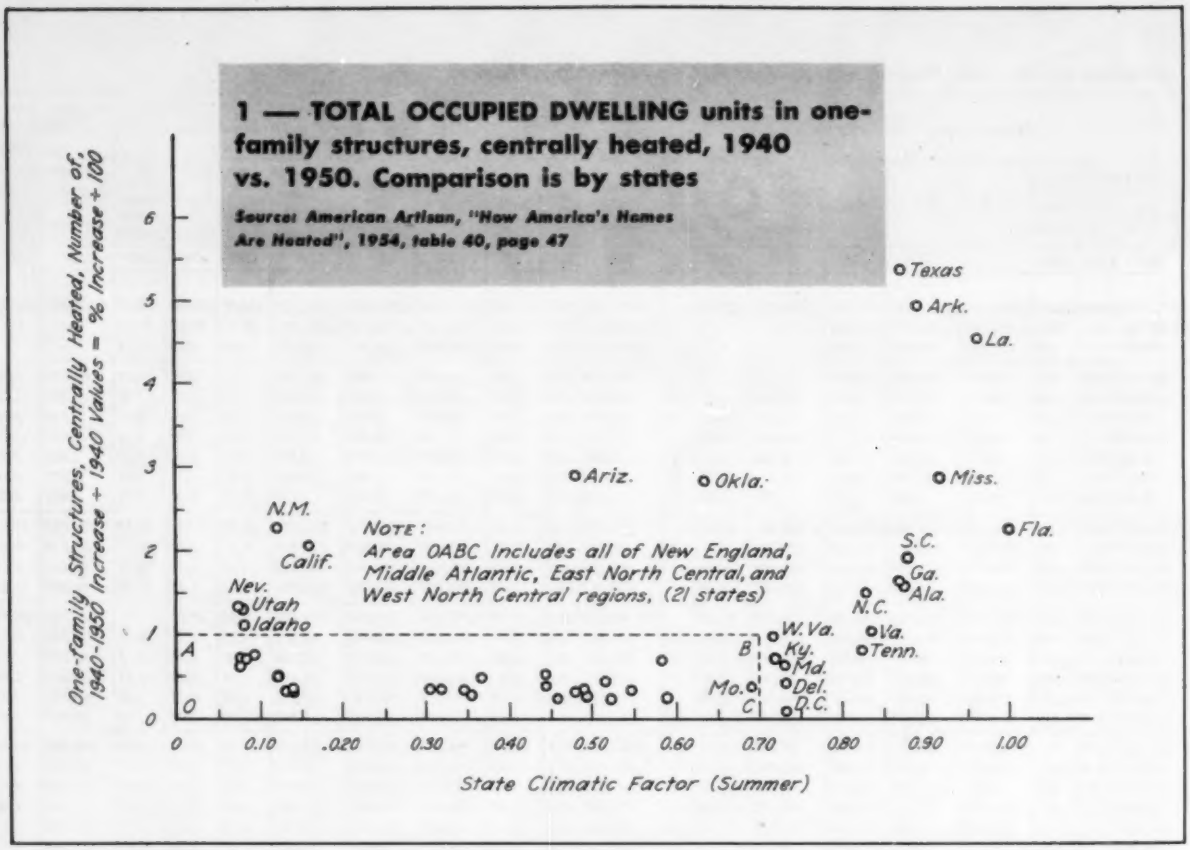
Sections and States	Climatic Factor		Total With and Without Central Heating		Total With Central Heating; Warm Air and Steam or Hot Water Systems				Warm Air								
						Climatic Factor X Number of Structures			Structures			Coal	Oil	Gas	Climatic Factor X Number of Structures		
	Cooling	Heating	Number	Percent U.S.	Number of Structures	Number	Percent U.S.	Rank	Number	% Col. 5	% U.S.				Number	Percent U.S.	Rank
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
UNITED STATES																	
Total	0.509	0.521	27,487,048	100.00	12,015,264	5,521,289	100.00	—	8,301,922	69.1	100.0	3,673,924	1,376,142	2,905,119	3,691,014	100.00	—
Urban & Rural Non-farm	—	—	22,099,488	80.40	—	—	—	—	7,504,108	—	90.4	3,189,217	1,261,958	2,832,602	—	—	—
Rural – Farm	—	—	5,387,560	19.60	—	—	—	—	797,814	—	9.6	484,707	114,184	72,517	—	—	—
NEW ENGLAND	0.346	0.690	1,142,464	4.15	838,886	288,095	5.21	—	296,569	35.4	3.6	127,136	124,042	17,845	93,649	2.53	—
Connecticut	0.446	0.640	251,983	0.91	205,965	91,860	1.66	19	79,157	38.4	1.0	32,054	38,971	4,376	35,304	0.95	26
Maine	0.133	0.847	160,286	0.59	74,091	9,854	0.18	40	44,232	59.7	0.5	14,788	17,924	996	5,883	0.16	40
Massachusetts	0.356	0.670	496,613	1.80	409,112	145,644	2.64	14	115,019	28.1	1.4	55,140	44,535	10,417	40,947	1.11	25
New Hampshire	0.140	0.847	85,474	0.31	51,408	7,197	0.13	42	26,061	50.7	0.3	11,081	10,622	587	3,649	0.10	43
Rhode Island	0.446	0.639	84,074	0.31	64,630	28,825	0.52	31	11,017	17.0	0.1	4,290	5,114	1,328	4,914	0.13	41
Vermont	0.140	0.849	64,034	0.23	33,680	4,715	0.08	44	21,083	62.6	0.3	9,783	6,876	141	2,952	0.08	46
MIDDLE ATLANTIC	0.484	0.603	3,779,559	13.75	2,953,760	1,450,369	26.27	—	1,333,888	45.2	16.1	835,156	217,634	245,078	651,988	17.67	—
New Jersey	0.548	0.574	654,967	2.38	559,986	306,872	5.56	5	182,246	32.5	2.2	90,665	64,605	21,779	99,871	2.71	12
New York	0.458	0.635	1,375,640	5.01	1,084,085	496,511	8.99	2	466,502	43.0	5.6	269,266	100,407	79,617	213,658	5.79	5
Pennsylvania	0.494	0.566	1,748,952	6.36	1,309,689	646,986	11.72	1	685,140	52.3	8.3	475,225	52,622	143,682	338,459	9.17	2
EAST NORTH CENTRAL	0.447	0.663	5,587,825	20.33	3,439,302	1,528,767	27.69	—	2,863,238	83.3	34.6	1,774,114	398,424	596,180	1,272,672	34.48	—
Illinois	0.489	0.627	1,327,769	4.83	836,479	409,038	7.41	4	614,152	73.4	7.4	420,558	92,863	88,050	300,320	8.13	3
Indiana	0.515	0.582	879,555	3.20	437,694	225,412	4.08	7	394,108	90.0	4.7	288,254	61,027	35,200	202,966	5.50	6
Michigan	0.365	0.754	1,242,175	4.52	797,820	291,204	5.28	6	666,704	83.6	8.1	366,271	119,512	155,741	243,347	6.59	4
Ohio	0.478	0.607	1,500,856	5.46	985,032	470,845	8.52	3	870,425	88.4	10.6	502,238	52,051	302,220	416,063	11.28	1
Wisconsin	0.346	0.794	637,470	2.32	382,277	132,268	2.40	15	317,849	83.1	3.8	196,793	72,971	14,969	109,976	2.98	10
WEST NORTH CENTRAL	0.517	0.670	3,072,383	11.18	1,425,290	726,673	13.16	—	1,194,124	83.8	14.4	509,792	204,774	423,657	615,894	16.68	—
Iowa	0.591	0.698	621,772	2.26	336,302	198,754	3.60	9	297,569	88.5	3.6	173,382	56,537	54,281	175,863	4.76	8
Kansas	0.582	0.529	465,420	1.70	182,523	106,228	1.92	16	166,106	91.0	2.0	21,017	7,892	132,210	96,674	2.62	13
Minnesota	0.319	0.849	598,938	2.18	326,746	104,232	1.89	17	243,358	74.5	2.9	89,930	71,414	61,476	77,631	2.10	16
Missouri	0.689	0.506	796,450	2.89	314,097	216,413	3.92	8	256,900	81.8	3.1	113,973	25,836	107,743	177,004	4.80	7
Nebraska	0.522	0.657	307,914	1.12	145,308	75,851	1.38	22	128,954	88.7	1.6	48,795	21,596	53,291	67,314	1.82	19
North Dakota	0.123	1.000	131,138	0.48	63,188	7,772	0.14	41	52,032	82.3	0.6	36,226	10,665	4,064	6,400	0.18	39
South Dakota	0.305	0.819	150,751	0.55	57,126	17,423	0.31	36	49,205	86.1	0.6	25,869	10,834	10,592	15,008	0.40	34
SOUTH ATLANTIC	0.840	0.343	4,057,499	14.76	904,124	715,509	12.96	—	505,430	55.9	6.0	158,438	180,749	139,909	405,708	10.99	—
Delaware	0.733	0.492	63,100	0.23	36,788	26,966	0.49	32	20,630	56.1	0.2	9,419	8,303	2,146	15,122	0.41	33
Dist. of Columbia	0.733	0.483	76,704	0.28	65,907	47,943	0.87	27	11,457	17.5	0.1	2,579	3,081	5,523	8,398	0.23	38
Florida	1.000	0.074	611,315	2.22	39,844	39,844	0.72	29	29,341	73.6	0.4	1,068	17,215	7,439	29,341	0.80	27
Georgia	0.870	0.269	653,608	2.38	82,996	72,207	1.31	24	68,382	82.4	0.8	11,674	10,152	42,846	59,492	1.61	22
Maryland	0.733	0.475	409,225	1.49	270,591	198,343	3.59	10	115,527	42.6	1.4	51,135	36,463	22,917	84,681	2.29	14
North Carolina	0.828	0.360	815,116	2.96	105,155	87,068	1.58	21	76,261	72.5	0.9	23,243	45,145	1,767	63,144	1.71	21
South Carolina	0.878	0.274	416,943	1.52	30,443	26,729	0.48	33	23,383	76.8	0.3	5,484	14,508	1,264	20,530	0.56	30
Virginia	0.835	0.429	605,101	2.20	175,761	146,760	2.66	13	84,391	48.0	1.0	24,533	43,246	11,743	70,466	1.91	17
West Virginia	0.717	0.577	406,387	1.48	97,139	69,649	1.26	25	76,058	78.3	0.9	29,303	636	44,864	54,534	1.47	23
EAST SOUTH CENTRAL	0.825	0.345	2,349,067	8.55	324,152	259,499	4.70	—	262,619	81.0	3.1	120,459	14,393	115,244	209,611	5.68	—
Alabama	0.876	0.246	615,116	2.24	60,377	52,890	0.96	26	50,478	83.6	0.6	13,274	4,389	30,217	44,219	1.20	24
Kentucky	0.720	0.484	601,340	2.19	129,223	93,041	1.68	18	108,403	83.9	1.3	58,255	5,280	42,531	78,050	2.12	15
Mississippi	0.919	0.251	459,353	1.67	28,389	26,090	0.48	34	19,602	69.0	0.2	460	597	16,027	18,014	0.49	32
Tennessee	0.824	0.356	673,258	2.45	106,163	87,479	1.58	20	84,136	79.3	1.0	48,470	4,427	26,469	69,328	1.87	18
WEST SOUTH CENTRAL	0.861	0.265	3,173,779	11.54	369,891	307,134	5.56	—	270,205	73.0	3.3	4,064	4,771	253,640	221,405	6.00	—
Arkansas	0.890	0.344	439,879	1.60	39,690	35,324	0.64	30	30,395	76.6	0.4	919	1,101	27,293	27,052	0.74	29
Louisiana	0.963	0.166	506,475	1.84	45,392	43,712	0.79	28	30,300	66.8	0.4	474	1,453	26,977	29,179	0.79	28
Oklahoma	0.684	0.600	532,352	1.94	107,740	73,694	1.34	23	93,188	86.5	1.1	996	635	90,135	63,741	1.72	20
Texas	0.872	0.200	1,695,073	6.16	177,069	154,404	2.79	12	116,322	65.7	1.4	1,675	1,582	109,235	101,433	2.75	11
MOUNTAIN	0.147	0.571	1,085,460	3.95	371,542	43,648	0.79	—	321,955	86.7	3.8	81,551	34,361	193,404	37,713	1.02	—
Arizona	0.480	0.180	165,688	0.61	31,175	14,964	0.27	38	26,764	85.9	0.3	156	1,155	24,654	12,847	0.35	36
Colorado	0.084	0.624	276,432	1.00	125,941	10,579	0.20	39	107,227	85.2	1.3	21,775	6,447	77,710	9,015	0.24	37
Idaho	0.181	0.619	140,055	0.51	39,284	3,182	0.05	47	35,226	89.7	0.4	21,483	9,633	546	2,853	0.08	47
Montana	0.076	0.831	135,591	0.49	47,811	3,634	0.07	45	41,474	86.7	0.5	8,054	7,016	22,827	3,152	0.09	45
Nevada	0.075	0.582	38,069	0.14	8,988	674	0.01	49	7,132	79.4	0.1	1,061	4,377	483	535	0.01	49
New Mexico	0.120	0.472	135,337	0.49	31,367	3,764	0.07	46	27,066	86.4	0.3	1,167	412	24,867	3,250	0.09	45
Utah	0.079	0.603	133,193	0.49	66,273	5,236	0.09	43	59,498	89.8	0.7	24,447	4,497	29,287	4,700	0.13	41
Wyoming	0.078	0.836	61,055	0.22	20,703	1,615	0.03	48	17,450	84.3	0.2	3,408	814	13,030	1,361	0.03	48
PACIFIC	0.146	0.311	3,239,012	11.79	1,388,317	201,595	3.66	—	1,253,894	90.3	15.1	63,214	196,994	920,162	182,374	4.95	—
California	0.159	0.241	2,290,317	8.33	1,038,585	165,135	2.99	11	941,382	90.6	11.4	3,144	15,233	903,502	149,680	4.06	9
Oregon	0.122	0.498	381,661	1.39	128,030	15,620	0.29	37	118,493	92.6	1.4	11,501	64,253	11,967	14,456	0.39	35
Washington	0.094	0.550	567,034	2.07	221,702	20,840	0.38	35	194,019	87.5	2.3	48,569	117,508	4,693	18,238	0.50	31

Notes; Sources; 1. Sources: 1950 CENSUS OF HOUSING, special tabulations prepared for AMERICAN ARTISAN and published in
2. Differences between the sums of columns 12+13+14 and column 9; also between columns 21+22+23 and

Structures in Year 'Round Residential Air Conditioning Market

Steam and Hot Water									Without Central Heating			Fuel Used — Oil and Gas						Oil and Gas Fired Warm Air Systems		
Structures						Climatic Factor X Number of Structures									Percent U.S.			Climatic Factor X Number of Structures		
Number	% Col. 5	% U.S.	Coal	Oil	Gas	Number	Percent U.S.	Rank	Number of Structures	Percent Col. 3	Percent U.S.	Total	Warm Air Systems	Steam or Hot Water Systems	Total	Warm Air Systems	Steam or H.W. Systems	Number	Percent U.S.	Rank
(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)
3,713,342	30.9	100.0	1,404,376	1,375,883	775,291	1,830,275	100.00	—	15,471,784	56.3	100.00	6,432,435	4,281,261	2,151,174	100.00	100.00	100.00	1,799,801	100.00	—
3,547,349	—	95.5	1,317,124	1,331,337	760,495	—	—	—	11,048,031	50.0	71.41	6,186,392	4,094,560	2,091,832	96.17	95.64	97.24	—	—	—
165,993	—	4.5	87,252	44,546	14,796	—	—	—	4,423,753	82.1	28.59	246,043	186,701	59,342	3.83	4.36	2.76	—	—	—
542,317	64.6	14.5	140,348	351,483	28,647	194,446	10.62	—	303,578	26.6	1.96	522,017	141,887	380,130	8.11	3.31	17.67	46,835	2.60	—
126,808	61.6	3.4	23,711	91,725	6,376	56,556	3.09	8	46,018	18.3	0.29	141,448	43,347	98,101	2.19	1.01	4.56	19,339	1.07	29
29,859	40.3	0.8	7,076	19,866	649	3,971	0.21	35	86,195	53.8	0.56	39,435	18,920	20,515	0.62	0.44	0.95	2,516	0.14	42
294,093	71.9	7.9	86,452	178,594	18,558	104,697	5.72	6	87,501	17.6	0.57	252,104	54,952	197,152	3.92	1.28	9.16	19,562	1.09	28
25,347	49.3	0.7	6,531	17,206	407	3,548	0.20	36	34,066	39.9	0.22	28,822	11,209	17,613	0.44	0.26	0.82	1,569	0.08	45
53,613	83.0	1.4	11,982	37,039	2,538	23,911	1.30	16	19,444	23.1	0.12	46,019	6,442	39,577	0.72	0.16	1.84	2,873	0.16	40
12,587	37.4	0.3	4,596	7,053	119	1,763	0.10	40	30,354	47.4	0.20	14,189	7,017	7,172	0.22	0.16	0.34	982	0.06	46
1,619,872	54.8	43.8	694,074	629,586	245,685	798,381	43.62	—	825,799	21.9	5.33	1,337,983	462,712	875,271	20.80	10.81	40.68	226,763	12.60	—
377,740	67.5	10.2	147,167	185,011	33,904	207,001	11.31	3	94,981	14.5	0.61	305,299	86,384	218,915	4.75	2.02	10.17	47,358	2.63	13
617,583	57.0	16.7	196,233	301,584	101,018	282,853	15.45	2	291,555	21.2	1.89	582,626	180,024	402,602	9.05	4.20	18.72	82,451	4.58	7
624,549	47.7	16.9	352,674	142,991	110,763	308,527	16.86	1	439,263	25.1	2.83	450,058	196,304	253,754	7.00	4.59	11.79	96,974	5.39	4
576,064	16.7	15.5	303,597	117,152	130,284	256,095	13.99	—	2,148,523	38.5	13.89	1,242,040	994,604	247,436	19.31	23.23	11.51	423,786	23.54	—
222,327	26.6	6.0	122,554	48,082	44,244	108,717	5.94	5	491,290	37.0	3.18	273,239	180,913	92,326	4.25	4.22	4.30	73,993	4.11	9
43,586	10.0	1.2	26,775	9,605	4,741	22,447	1.23	18	441,861	50.2	2.86	110,573	96,227	14,346	1.72	2.25	0.66	49,557	2.75	12
131,116	16.4	3.5	68,755	28,002	27,242	47,857	2.61	11	444,355	35.8	2.87	330,497	275,253	55,244	5.14	6.43	2.57	100,467	5.58	3
114,607	11.6	3.1	50,106	10,161	50,097	54,782	2.99	9	515,824	34.4	3.33	414,529	354,271	60,258	6.44	8.27	2.80	169,342	9.41	1
64,428	16.9	1.7	34,407	21,302	3,960	22,292	1.22	19	255,193	40.0	1.65	113,202	87,940	25,262	1.76	2.06	1.18	30,427	1.69	22
231,166	16.2	6.0	90,142	58,554	68,102	110,779	6.05	—	1,647,093	53.6	10.65	755,087	628,431	126,656	11.74	14.68	5.88	328,844	18.28	—
38,733	11.5	1.0	20,459	9,339	6,399	22,891	1.25	17	285,470	45.9	1.85	126,556	110,818	15,738	1.97	2.59	0.73	65,493	3.64	10
16,417	9.0	0.4	2,057	798	12,519	9,554	0.52	29	282,897	60.8	1.82	153,419	140,102	13,317	2.38	3.27	0.62	81,539	4.53	8
83,388	25.5	2.2	26,598	32,152	19,141	26,600	1.46	14	272,192	45.4	1.76	184,183	132,890	51,293	2.87	3.10	2.38	42,392	2.36	17
57,197	18.2	1.5	24,362	8,248	21,454	39,409	2.15	13	482,353	60.6	3.12	163,281	133,579	29,702	2.53	3.12	1.38	92,036	5.11	6
16,354	11.3	0.4	5,636	3,470	6,208	8,537	0.47	30	162,606	52.8	1.05	84,565	74,887	9,678	1.32	1.75	0.45	39,091	2.17	18
11,156	12.7	0.3	6,898	2,351	1,257	1,372	0.07	42	67,950	51.8	0.44	18,337	14,729	3,608	0.28	0.35	0.17	1,812	0.10	44
7,921	13.9	0.2	4,132	2,196	1,124	2,416	0.13	38	93,625	62.1	0.61	24,746	21,426	3,320	0.39	0.50	0.15	6,535	0.37	37
398,694	44.1	10.9	123,261	183,444	71,083	309,801	16.93	—	3,153,375	77.7	20.38	575,185	320,658	254,527	8.94	7.49	11.84	260,429	14.47	—
16,158	43.9	0.4	4,691	9,832	1,263	11,844	0.65	26	26,312	41.7	0.17	21,544	10,449	11,095	0.33	0.24	0.52	7,659	0.42	35
53,950	82.5	1.5	14,172	19,193	19,033	39,545	2.16	12	11,297	14.7	0.07	46,830	8,604	38,226	0.73	0.20	1.78	6,307	0.35	38
10,503	26.4	0.3	1,204	3,375	2,479	10,503	0.58	27	571,471	93.5	3.69	30,508	24,654	5,854	0.48	0.58	0.27	24,654	1.37	27
14,614	17.6	0.4	3,977	1,578	7,840	12,714	0.69	25	570,612	87.3	3.69	61,816	52,398	9,418	0.96	1.22	0.44	45,586	2.54	15
155,064	57.3	4.2	92,211	93,359	23,947	113,663	6.21	4	138,634	33.9	0.90	178,686	61,380	117,306	2.77	1.44	5.45	44,992	2.50	16
28,894	27.5	0.8	15,324	10 442	477	23,924	1.31	15	709,961	87.1	4.59	57,831	46,912	10,919	0.90	1.09	0.51	38,843	2.15	19
7,060	23.2	0.2	2,715	3,125	272	6,199	0.34	34	386,500	92.7	2.49	19,169	15,772	3,397	0.30	0.37	0.16	13,848	0.77	31
91,370	52.0	2.5	39,625	41,474	5,904	76,294	4.17	7	429,340	71.0	2.78	102,367	54,989	47,378	1.59	1.28	2.20	45,916	2.55	14
21,081	21.7	0.6	9,342	1,066	9,868	15,115	0.82	22	309,248	76.1	2.00	56,434	45,500	10,934	0.88	1.07	0.51	32,624	1.82	21
61,533	19.0	1.7	25,205	3,454	27,349	49,888	2.73	—	2,024,915	86.2	13.09	160,440	129,637	30,803	2.49	3.03	1.43	105,214	5.84	—
9,899	16.4	0.3	4,048	611	4,632	8,672	0.47	31	554,739	90.2	3.58	39,549	34,306	5,243	0.62	0.80	0.24	30,052	1.67	23
20,820	16.1	0.6	10,521	1,523	7,591	14,991	0.82	23	472,117	78.5	3.06	56,925	47,811	9,114	0.88	1.12	0.42	34,427	1.91	20
8,787	31.0	0.2	595	205	7,296	8,075	0.44	39	430,964	93.8	2.78	24,125	16,624	7,501	0.38	0.38	0.35	15,277	0.85	30
22,027	20.7	0.6	10,041	1,115	7,830	18,150	1.00	20	567,095	84.2	3.67	39,841	30,896	8,945	0.61	0.73	0.42	25,458	1.41	25
99,686	27.0	2.7	2,689	1,849	91,846	85,729	4.68	—	2,803,888	88.3	18.12	352,106	258,411	93,695	5.48	6.09	4.35	211,367	11.75	—
9,295	23.4	0.3	459	396	7,926	8,272	0.45	32	400,189	91.0	2.58	36,706	28,394	8,312	0.58	0.66	0.38	25,271	1.41	26
15,098	33.2	0.4	302	322	14,099	14,533	0.79	24	461,083	91.0	2.98	42,851	28,430	14,421	0.66	0.66	0.67	27,378	1.52	24
14,552	13.5	0.4	421	331	13,451	9,954	0.55	28	424,612	79.8	2.75	104,552	90,770	13,782	1.63	2.12	0.65	62,086	3.45	11
60,747	34.3	1.6	1,507	810	58,370	52,970	2.89	10	1,518,004	89.6	9.81	167,997	110,817	57,180	2.61	2.59	2.65	96,632	5.37	5
49,587	13.3	1.3	14,394	5,119	26,359	5,935	0.32	—	713,918	65.8	4.61	259,243	227,765	31,478	4.03	5.32	1.47	29,698	1.65	—
4,411	14.1	0.1	399	310	3,547	2,118	0.12	39	134,513	81.2	0.87	29,666	25,809	3,857	0.46	0.60	0.18	12,388	0.68	32
18,614	14.8	0.5	4,265	1,080	12.733	1,564	0.08	41	150,491	54.4	0.97	97,970	84,157	13,813	1.52	1.97	0.64	7,069	0.40	36
4,058	10.3	0.1	2,376	930	45	329	0.02	47	100,811	72.0	0.65	11,154	10,179	975	0.18	0.24	0.05	825	0.04	48
6,337	13.3	0.2	1,597	845	3,380	482	0.03	46	87,760	64.7	0.57	34,078	29,853	4,225	0.53	0.69	0.20	2,269	0.13	43
1,856	20.6	—	310	905	133	139	—	49	29,081	76.4	0.19	5,898	4,860	1,038	0.09	0.12	0.04	365	0.02	49
4,281	13.6	0.1	821	246	2,692	514	0.03	45	103,970	76.8	0.67	28,217	25,279	2,938	0.44	0.59	0.14	3,033	0.17	39
6,777	10.2	0.2	3,746	495	1,896	535	0.03	44	66,920	50.2	0.43	36,175	33,784	2,391	0.56	0.79	0.11	2,669	0.15	41
3,253	15.7	0.1	880	308	1,933	254	0.01	48	40,352	66.1	0.26	16,085	13,844	2,241	0.25	0.32	0.11	1,080	0.06	47
134,423	9.7	3.6	10,666	25,242	85,936	19,221	1.06	—	1,850,695	57.1	11.97	1,228,334	1,117,156	111,178	19.10	26.10	5.17	166,865	9.27	—
97,203	9.4	2.6	3,895	2,776	84,521	15,455	0.85	21	1,251,732	54.7	8.09	1,006,032	918,735	87,297	15.64	21.46	4.05	146,079	8.11	2
9,537	7.4	0.3	924	5,404	901	1,164	0.06	43	253,631	66.5	1.64	82,525	76,220	6,305	1.28	1.78	0.30	9,299	0.52	34
27,683	12.5	0.7	5,847	17,062	514	2,602	0.15	37	345,332	60.9	2.24	139,777	122,201	17,576	2.18	2.86	0.82	11,487	0.64	33

How America's Homes Are Heated, Copyright 1954.
column 18 represent wood and other fuels plus cases where the fuel was not reported



est state in the United States, and the state which requires the greatest fuel consumption for satisfactory heating during the year.

Column 3 indicates the number of occupied dwellings in one-family structures with and without central heating; the total is 27,487,048 such dwellings. Those separate structures which have central heating, both warm air and wet heat types, are indicated by column 5 to be 12,015,264 dwellings. Column 6 indicates the effect of the application of the summer climatic factor to the total number of structures with central heating, and the percent distribution by states is indicated in column 7. Column 8 ranks the states as to number of structures corrected for summer climatic factor. Columns 9 through 17 indicate for those structures of the one-family type heated by warm air, the number heated by coal, oil, and gas. Column 15 shows the distribution among the 48 states and the District of Columbia corrected for summer climatic factor.

Similarly, columns 18 through 26 provide the same analysis for the steam or hot water systems.

Column 27 indicates the number of structures of the single-family type without central heating; column 28 indicates the percentage of the total number of single-family structures (with and without central heating) which do not have central heat in each of the states, and column 29 is the distribution of the separate one-family structures without central heating by states.

Because there has been a tendency in the early development of the year 'round residential air conditioning business to convert oil and gas systems to year 'round air conditioning, columns 30 through 38 are devoted to the structures heated by oil or gas, deleting the numerous structures heated by coal.

Even though there are a substantial number of dwelling units heated by coal, the Census of Housing in making comparisons between units in 1940 and those in 1950, definitely shows the trend away from the use of coal as a fuel, and a distinct and definite gain by the warm air systems using gas and oil as fuels.

Residential Air Conditioning Growing

Prior to the publication of the Bureau of the Census' 1953 *Facts for Industry* report, there was a

general consensus to the effect that 50,000 year 'round residential systems had been sold in the calendar 1953. The recently issued census report makes it difficult to show that such a number was actually sold. In the category of year 'round air conditioners as such, the number of units reported totalled 12,862. In addition there were 986 heat pumps. By making assumptions with respect to the portion of refrigeration chassis for air conditioning plus self-contained air conditioners in the 2, 3, and 5 hp sizes that were reported by industry to the Commerce Department, the number of systems sold for residential use in 1953 can be built up to about 33,700 units, assuming 1/3 of the refrigeration chassis being applied for residential duty, and 1/5 of the 2, 3, and 5 hp self-contained air conditioners total being installed in residences. (*Editor's Note* — Other estimates by well-informed sources put the total of central residential cooling installations during 1953 at 50,000.)

This would seem to indicate a total dollar value of the residential business on the basis of our assumptions at about $27,500,000 at manufacturers' selling price, involving about 121,000 horsepower as electric load for the utilities.

Previous estimates relative to the growth of this segment of the business in reference 3 were somewhat higher than the present estimate of 121,000 hp. It is interesting to note, however, that assuming a leveling-off point in the annual sale of room air conditioners is about 2,000,000 per year, and a leveling-off point in the sale of year 'round residential systems is 500,000 per year, in about 1957 we should expect the electric load imposed by residential systems to just about equal the residential load of room air conditioners, moving from that point forward at an increasing rate, while the room air conditioner load added each year would run somewhat less than that of the central residential unit.

The Search for a Climatic Factor

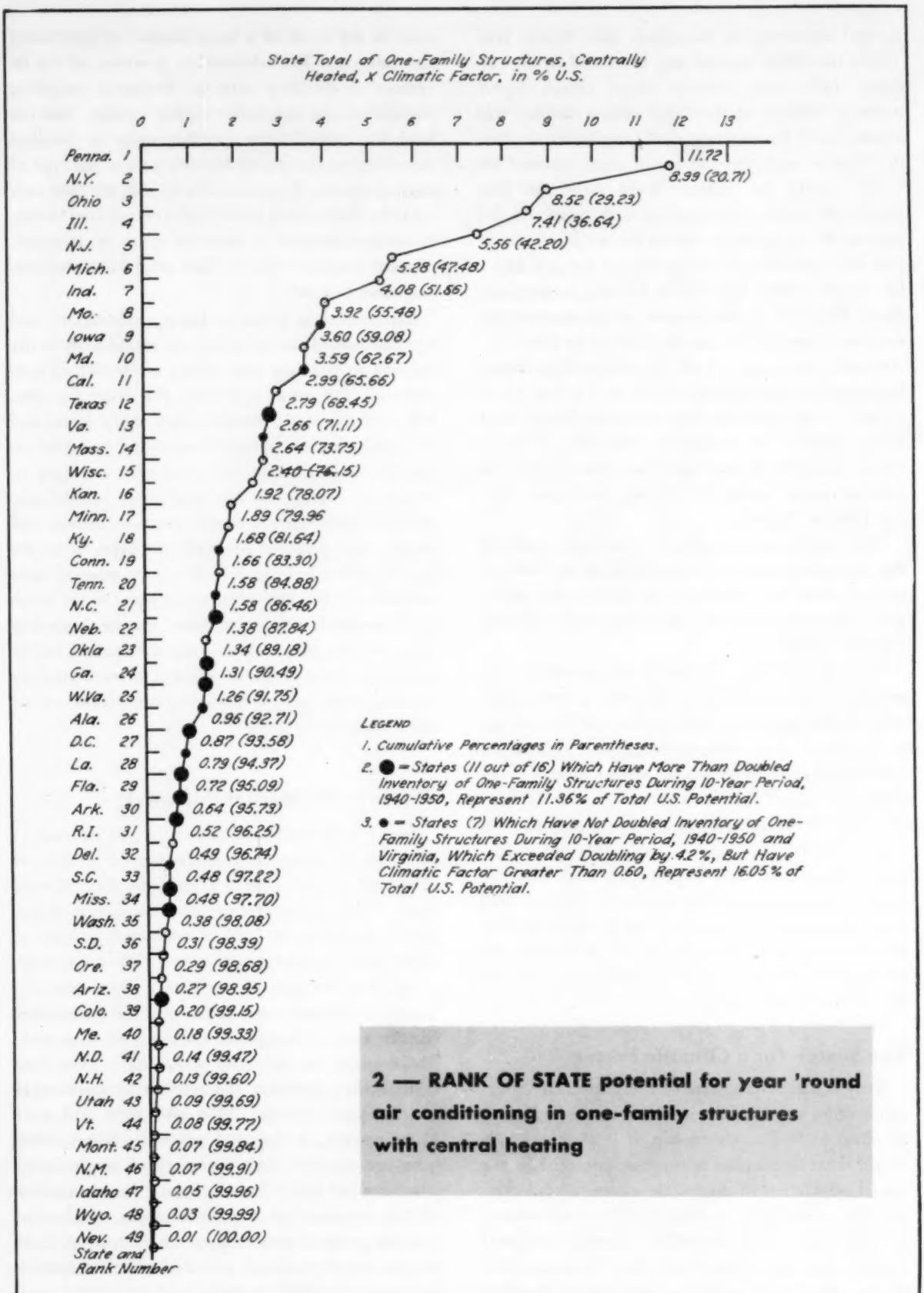
Early in the development of this paper, the census information was carefully analyzed by the authors in an effort to find a relationship, if it existed, which would make it possible to measure potential by the use of population or disposable income of individuals. The inventory of dwelling units is closely related to population and disposable income, weighted equally, even in the states of New York and California, which have a heavy inventory of dwelling units as the result of a large number of apartments for transients. The relationship, however, of the inventory of dwelling units as developed, weighing population and disposable income equally, does not hold for single-family dwelling units in detached structures, or for quality features such as the type of heating system. Thus, it tends to indicate that each area is a distinct and *individual economy* conforming to its environment in terms of types of structure, physical features, climate, fuel availability, income, and other factors.

Recognition is given to buying motivations and practical considerations which are contributory in the decision to purchase year 'round residential air conditioning. For instance, climate, the desire for comfort, and the social characteristics of the buyer and his family, are examples of motivating forces which defy precise evaluation, but which exist and have an important bearing on the real sales possibilities. Physical characteristics of the structure, income and wealth, and possible alternate purchases, illustrate practical considerations which may be assessed most satisfactorily for individual situations. On the other hand, modernization expenditures may be reasonably expected after more urgent needs are satisfied, and in search for a clue in this direction, a series of analyses showing trends in new residential construction reveal some significant results.

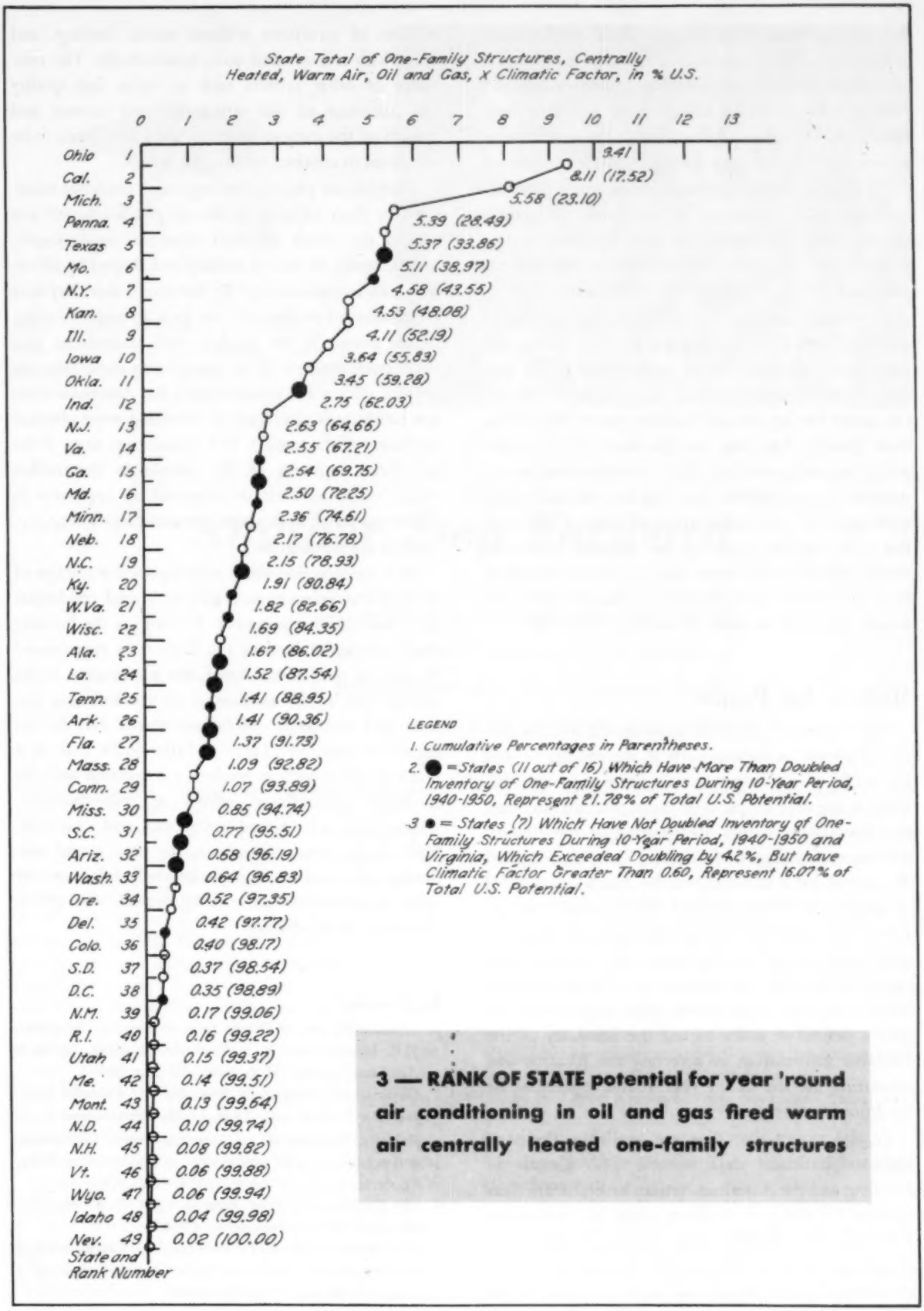
Where Is the Market Potential?

Fig. 1 indicates by states the percent increase in single-family structures centrally heated in 1950 as compared to 1940 plotted against the state climatic factor. There is a surprising rate of increase in single-family structures in 1950 as compared to 1940 in those states having climatic factors higher than 0.60.

Fig. 2 is the plot of the state total of centrally heated single-family structures corrected for summer climatic factor, arranged in the order of state rank. Those states are indicated which have more than doubled their inventory of single-family structures in the ten years between 1940 and 1950 and have 11.36 percent of the total potential. States which have not doubled their inventory of single-family structures but which have a climatic factor in excess of 0.60 represent 16.05 percent of the total, — so that this group of states, representing a total of 27.41 percent of the national potential before correction for owner-occupied structures without central heat-


State Total of One-Family Structures, Centrally Heated, X Climatic Factor, in % U.S.
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Penna. 1 11.72
N.Y. 2 8.99 (20.71)
Ohio 3 8.52 (29.23)
Ill. 4 7.41 (36.64)
N.J. 5 5.56 (42.20)
Mich. 6 5.28 (47.48)
Ind. 7 4.08 (51.56)
Mo. 8 3.92 (55.48)
Iowa 9 3.60 (59.08)
Md. 10 3.59 (62.67)
Cal. 11 2.99 (65.66)
Texas 12 2.79 (68.45)
Va. 13 2.66 (71.11)
Mass. 14 2.64 (73.75)
Wisc. 15 2.40 (76.15)
Kan. 16 1.92 (78.07)
Minn. 17 1.89 (79.96
Ky. 18 1.68 (81.64)
Conn. 19 1.66 (83.30)
Tenn. 20 1.58 (84.88)
N.C. 21 1.58 (86.46)
Neb. 22 1.38 (87.84)
Okla 23 1.34 (89.18)
Ga. 24 1.31 (90.49)
W.Va. 25 1.26 (91.75)
Ala. 26 0.96 (92.71)
D.C. 27 0.87 (93.58)
La. 28 0.79 (94.37)
Fla. 29 0.72 (95.09)
Ark. 30 0.64 (95.73)
R.I. 31 0.52 (96.25)
Del. 32 0.49 (96.74)
S.C. 33 0.48 (97.22)
Miss. 34 0.48 (97.70)
Wash. 35 0.38 (98.08)
S.D. 36 0.31 (98.39)
Ore. 37 0.29 (98.68)
Ariz. 38 0.27 (98.95)
Colo. 39 0.20 (99.15)
Me. 40 0.18 (99.33)
N.D. 41 0.14 (99.47)
N.H. 42 0.13 (99.60)
Utah 43 0.09 (99.69)
Vt. 44 0.08 (99.77)
Mont. 45 0.07 (99.84)
N.M. 46 0.07 (99.91)
Idaho 47 0.05 (99.96)
Wyo. 48 0.03 (99.99)
Nev. 49 0.01 (100.00)
State and Rank Number
LEGEND
1. Cumulative Percentages in Parentheses.
2. ● = States (11 out of 16) Which Have More Than Doubled Inventory of One-Family Structures During 10-Year Period, 1940-1950, Represent 11.36% of Total U.S. Potential.
3. ● = States (7) Which Have Not Doubled Inventory of One-Family Structures During 10-Year Period, 1940-1950 and Virginia, Which Exceeded Doubling by 4.2%, But Have Climatic Factor Greater Than 0.60, Represent 16.05% of Total U.S. Potential.

2 — RANK OF STATE potential for year 'round air conditioning in one-family structures with central heating


State Total of One-Family Structures, Centrally Heated, Warm Air, Oil and Gas, X Climatic Factor, in % U.S.
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Ohio 1 — 9.41
Cal. 2 — 8.11 (17.52)
Mich. 3 — 5.58 (23.10)
Penna. 4 — 5.39 (28.49)
Texas 5 — 5.37 (33.86)
Mo. 6 — 5.11 (38.97)
N.Y. 7 — 4.58 (43.55)
Kan. 8 — 4.53 (48.08)
Ill. 9 — 4.11 (52.19)
Iowa 10 — 3.64 (55.83)
Okla. 11 — 3.45 (59.28)
Ind. 12 — 2.75 (62.03)
N.J. 13 — 2.63 (64.66)
Va. 14 — 2.55 (67.21)
Ga. 15 — 2.54 (69.75)
Md. 16 — 2.50 (72.25)
Minn. 17 — 2.36 (74.61)
Neb. 18 — 2.17 (76.78)
N.C. 19 — 2.15 (78.93)
Ky. 20 — 1.91 (80.84)
W.Va. 21 — 1.82 (82.66)
Wisc. 22 — 1.69 (84.35)
Ala. 23 — 1.67 (86.02)
La. 24 — 1.52 (87.54)
Tenn. 25 — 1.41 (88.95)
Ark. 26 — 1.41 (90.36)
Fla. 27 — 1.37 (91.73)
Mass. 28 — 1.09 (92.82)
Conn. 29 — 1.07 (93.89)
Miss. 30 — 0.85 (94.74)
S.C. 31 — 0.77 (95.51)
Ariz. 32 — 0.68 (96.19)
Wash. 33 — 0.64 (96.83)
Ore. 34 — 0.52 (97.35)
Del. 35 — 0.42 (97.77)
Colo. 36 — 0.40 (98.17)
S.D. 37 — 0.37 (98.54)
D.C. 38 — 0.35 (98.89)
N.M. 39 — 0.17 (99.06)
R.I. 40 — 0.16 (99.22)
Utah 41 — 0.15 (99.37)
Me. 42 — 0.14 (99.51)
Mont. 43 — 0.13 (99.64)
N.D. 44 — 0.10 (99.74)
N.H. 45 — 0.08 (99.82)
Vt. 46 — 0.06 (99.88)
Wyo. 47 — 0.06 (99.94)
Idaho 48 — 0.04 (99.98)
Nev. 49 — 0.02 (100.00)
State and Rank Number
LEGEND
1. Cumulative Percentages in Parentheses.
2. ● = States (11 out of 16) Which Have More Than Doubled Inventory of One-Family Structures During 10-Year Period, 1940-1950, Represent 21.78% of Total U.S. Potential.
3 ● = States (7) Which Have Not Doubled Inventory of One-Family Structures During 10-Year Period, 1940-1950 and Virginia, Which Exceeded Doubling by 4.2%, But have Climatic Factor Greater Than 0.60, Represent 16.07% of Total U.S. Potential.

3 — RANK OF STATE potential for year 'round air conditioning in oil and gas fired warm air centrally heated one-family structures

ing, do represent areas for immediate development.

Similarly, Fig. 3 develops the states in the order of rank and shows single-family structures centrally heated with warm air using oil or gas as a fuel. States which have more than doubled their inventory of one-family structures during 1940-1950 represent 21.78 percent of the potential; states which have not doubled their inventory of one-family structures during 1940-1950 but which have a climatic factor greater than 0.60, offer 16.07 percent of the national potential, — or 37.85 percent in 19 states.

It is significant that 13 out of the top ranking 15 states on both Figs. 2 and 3 are the same states, and respectively represent 62.68 percent and 71.11 percent of the national potential. Based on these studies, the states having climatic factors greater than 0.60, even though they may not be major mass market areas, suggest immediate sales development opportunities. As competitive pressures increase and public acceptance of residential air conditioning grows in the mass market areas of the densely populated states, climate and summer discomfort may very well be of somewhat lesser motivation than the desire for a well equipped modern or modernized home.

Markets Are People

It is well known that the business and social activities of people in various parts of the country — and the world — are in many ways attuned to their climate, as are their crops, their dress, their architecture, and their living habits. Recognition of the climatic distortions, as suggested in reference 1, and applied to a set of basic statistics, can be used as a standard of geographic distribution of the potential. The regional and state distribution of estimated potential may be considered in comparison with a single company's (preferably the industry's) sales development results, not only on an annual basis but cumulatively over a period of years, to test the adequacy of the available information in detecting the location and measuring the size of the year 'round residential air conditioning market.

To the extent that they are available, the basic absolute statistical data of the 1950 Census of Housing and the American Artisan brochure are clear enough. Of the factors which apply in combination with the base absolute data (count of one-family structures, etc.) in shaping the market, climate is certainly of major significance as is confirmed by the number of structures without central heating, and one which is evaluated quite satisfactorily. The relevance of other criteria such as value and quality characteristics of the structures, and income and wealth of the owners, to name but a few, need to be subjected to continual study and review.

Markets are people who represent potential measured by their capacity to absorb goods and services within the limits of their inherent requirements, wants, needs, or desires created and shaped by advertising and salesmanship! To the extent that they may be catalogued statistically, we gain an understanding of the people in the market, their possessions, and their environments. It is toward this area that our present efforts are directed, and the American Artisan brochure is significant in revealing some physical attributes of the market. But, in addition, there is the emotional response of the people in the market which reacts on their decision-making apparatus in numerous ways; in this area, present cataloguing procedures are inadequate.

New construction tends to bring with it the use of modern conveniences such as year 'round residential air conditioning equipment. So long as the housing starts are maintained at the high rates experienced during the past several years, the acceleration in the use of year 'round residential air conditioning systems and increasing public acceptance can be expected to continue. There is little doubt that as a result of the trends in modern construction and the combined promotional efforts of manufacturers, wholesalers, dealers, and contractors, and — not the least — the users' enthusiasm, the year 'round residential air conditioning market will offer greater sales opportunities as earning power and living standards move upward.

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2. *Climatic and Geographic Evaluation of Potential Comfort Air Conditioning Loads,* J. R. Hertzler and V. T. Kartorie, Presentation to American Power Conference, and published in the proceedings of the American Power Conference, March 24-26, 1954, Vol. XVI.
3. *Air Conditioning Peak Seen in 1963,* J. R. Hertzler, Electrical World, November 1954.
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FIRST GRADUATE, Ronald C. Allen (left) receives the certificate of completion from Edward F. Carlough as Robert P. Johnsen (right) waits to name the next apprentice to graduate

Another Step Forward

. . . is taken by Chicago area sheet metal contractors and union representatives as Joint Apprenticeship Committee holds first graduation exercises

THE JOINT Apprenticeship Committee for the sheet metal trade of Cook and Lake Counties, Ill., has taken another stride forward in its program of developing a closer relationship between contractors and union for the good of the industry. The first anniversary graduation exercises for 39 apprentices who have just completed their training program under the guidance of this group was held October 28. Attending were representatives from each of the contributing contractor associations — the Ventilating and Air Conditioning Contractors' Association of Chicago, the Sheet Metal Contractors' Association of Cook County, The Air Conditioning Contractors' Alliance, Blow Pipe and Dust Control Industry of Chicago, and officers of the Sheet Metal Workers' International Association Local 73.

Chairman of the exercises was James T. Tracy, secretary of the Joint Apprenticeship Committee in Chicago.

From Washington, D.C. came Edward F. Carlough, a graduate of the New York apprentice school in 1927, and general secretary-treasurer of the sheet metal workers' union, to welcome the new journeymen into the international association. In his address Mr. Carlough said, "This occasion is equal in many ways to the graduation exercises held each June at colleges throughout the country. The colleges turn out people to perform certain services for the society in which we live; many of the services they render must be carried through to completion by fellows like you. Everyone has his place in industry, and yours is a most important one because of the high degree of skill you have developed.

"In the past five years you have gained many new experiences, but if you feel you know all there is to be known about your trade, you're in for some surprises. You must continue to study and stay abreast of the many new developments that are taking place month after month. The field of air conditioning is but one of the many branches of our industry that has barely scratched the surface of its eventual potential.

"To be a good representative of your trade, you should study all you can about the components that go into an air conditioning system, know how they function and how they should be installed to reach their highest peak of performance.

"Every good member of an industry will be interested enough to learn all about it, from top to bottom, and will give a fair day's work for a fair day's pay.

"A weak apprenticeship training program will result

(This article continued on page 94)

Case Histories from a Consulting Engineer's files

The Case of the Poorly Heated Parsonage

By C. T. Baker
Consulting Engineer

- **Where to look for excessive heat losses**
- **What remedies to recommend**
- **When savings in fuel bills warrant the cost involved**

THE HOUSE WAS a modern, single story brick building, which contained a modern warm air heating plant. The operation of the oil burner was automatic and controlled — within limits — the amount of heat release in the furnace. There was a large attic space above the ceiling.

Louvered openings were provided in the gables at each end of the structure and a continuous ventilator extended along the ridge of the roof for its full length. There was no way of closing any of these vents during cold weather.

A ventilating fan had been installed in the attic to pull cool air through the building at night during the summer. This fan was located approximately in the center of the attic.

The distance from the fan to the louvered air outlets was too great to permit the fan to discharge all of the air being handled to the outdoors. This, of course, was no fault of the fan.

A Source of Heat Loss

A short duct extending through the living room ceiling to the attic enabled the fan to pull cool night air through a louver located in an outside wall of the living room. Outside air was pulled into other rooms through partially opened windows.

The interesting thing about the living room flue to the attic was that it could not be closed, which meant that it was open to the attic during the winter as well as in summer. Since the attic was not tight, due to the open gable and ridge ventilator, a continuous stream of heated air was pulled into the attic by the stack effect of this duct during the winter months.

Uninsulated Air Ducts in Attic

One of the reasons for the inadequate heating and high fuel bills complained of by the occupants of the home was the absence of duct insulation.

In this installation, warm air passed from the furnace through a series of drops that delivered warm air to the rooms below.

Delivery of warm air uniformly throughout the house was no problem; the problem was to release sufficient heat in the furnace to overcome the duct heat loss to the attic and still have enough heat left in the air to produce comfortable conditions throughout the living portions of the house.

Some idea of the amount of heat lost to the cold attic may be gained from the size of the ducts used. The supply duct in the attic is 30 × 10 in., and the return duct, located in the basement, is 20 × 10 in.

Unheated Basement and Cold Floors

The furnace was located in the basement, the walls of which contained several ventilators. No means had been provided for closing these vents during the heating

season. Consequently, the loss of heat from those portions of the supply and return air ducts located in the basement was excessive.

In addition, much of the underside of the floor above the basement was cooled to near outdoor temperatures because of the open vents.

Absence of Flame Failure Control

No means had been provided for closing off the supply of oil to the oil burners in case of flame failure. Since it is possible to secure flame failure protection for home heating plants burning either gas or oil, it was recommended that such protection be provided.

Recommendations for Improving the Situation

The following recommendations were made as a means of improving heating capacity and reducing the fuel bill:

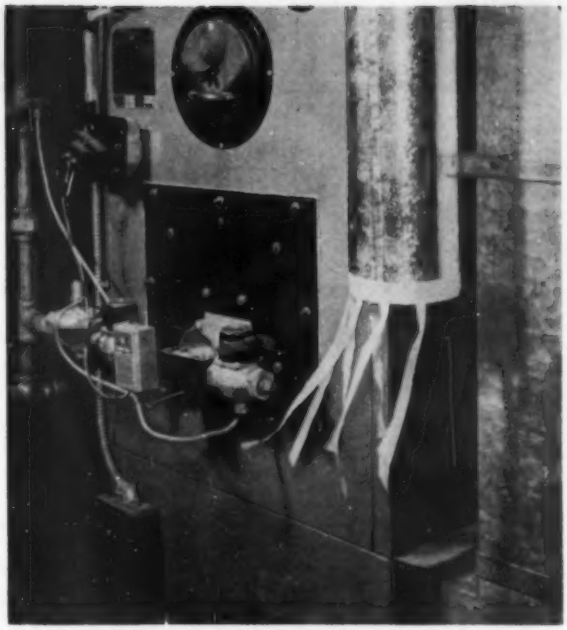
1) That all exposed ductwork in the attic and in the basement be insulated according to the manufacturer's recommendations.

2) That doors be provided on all basement vents to permit closing during the winter months.

3) That a separate air duct be provided for supplying combustion air from outside, that the duct be provided with a manually operated damper conveniently located and that the intake end of this duct be protected by a screen.

4) That the attic fan be moved to a location where it could discharge directly outdoors and that means for closing the attic gable and ridge vents during the heating season be provided.

5) That the flue duct connecting the living room with the attic have a louvered grille installed whereby the attic opening could be closed off during the heating season.



TO KEEP the basement warm, outside openings were sealed and a round duct was used to pipe outside air to the furnace for combustion purposes

Most of the recommendations have been carried out. The insulation of the exposed ductwork has resulted in a reduction in fuel consumption and a comfortable condition now exists throughout the home during the coldest weather.

Perimeter System Used in "House of Ideas"

The 1954 *House of Ideas*, a three-level floor plan designed by architect Philip Ives and built on a typical flat lot in the suburb of West Hartford, Conn., will do much to promote perimeter heating and cooling in larger residences. It has 2208 sq ft of space.

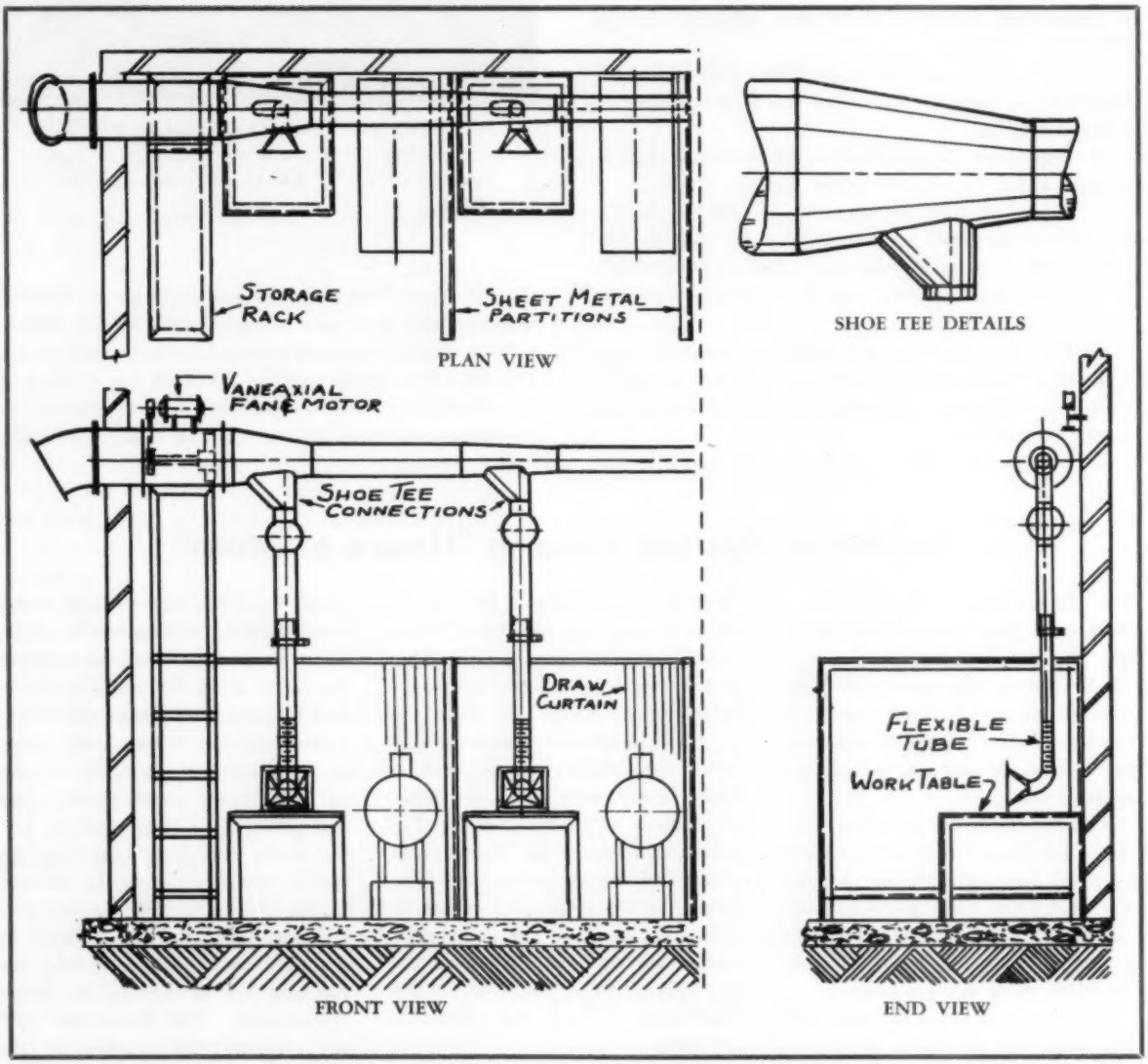
This model home combines concrete slab floor construction with a basement area under the living room. Yet all of these areas are heated and cooled with a perimeter system from a combination unit in an air conditioning room in the basement.

The layout of the system uses two individual loop systems to serve areas constructed on a concrete slab. The combined floor area handled by the loops is approximately 1500 sq ft. Ducts for both loops take off from the plenum of the upflow heating and cooling unit and drop downward to enter the concrete slab. One loop supplies conditioned air through baseboard diffusers to the kitchen-dining room area, while the other loop serves the bedroom wing. The conditioned air to the living room is supplied through rectangular ducts located in the floor joist spaces to diffusers located on the outer walls underneath windows. Each area has a provision for returning air to the conditioner through the electronic air filter.

A number of steps were taken to reduce heat losses during winter months and heat gains during warm weather. Many of these can be adapted in other houses if considered when the house is in the planning stage. Besides normal insulation and weatherproofing, consideration was given to orientation of the house on the lot. The dining room, living room and gallery have large windows facing south. This gives heat from the sun in winter, reducing the demand on the heating system. In summer, however, when the sun is high in the sky, roof overhangs keep off sun and aid in cooling the house economically. This house has only one standard size window on the west side with a ribbon of high living room windows shielded by eaves.

HUGH REID'S SHEET METAL PATTERN

Developing a Layout for



1 PARTIAL VIEW of a welding shop fume exhaust system. Enlarged view of the fitting described this month is shown at top right

a Tapered Shoe Tee

. . . located in the bottom of a tapered fitting. Such a location is suitable for welding and other fume removing systems. However, systems used for solid material should use top or side takeoffs because of the velocity drop at the branches

THIS MONTH'S pattern problem deals with the layout of a shoe tee fitting attached to the center of a tapered fitting. The fitting described was used in the fume exhaust system for the welding shop of a manufacturing plant.

The fabrication of fittings for an exhaust system of this type should take into consideration, along with other requirements of fume removal systems, the following recommendations: storage for welding supplies and equipment, lifting equipment for heavy pieces of work, protection of workmen against welding flash, and adequate removal of smoke and fumes from the building.

The storage of welding supplies and equipment should be given consideration because of the freedom of movement required to give maximum flexibility to the branch pipe and its suction hood.

Proper location of hoist supports so that heavy equipment can be brought in close proximity to the system intake hood is necessary in order for the exhaust system to perform its primary purpose.

Sheet metal partitions and fireproof draw curtains will not only isolate each operation but will aid in assuring adequate evacuation of the welding fumes.

The complete removal of all air contaminating fumes is the primary purpose of all exhaust systems. To meet this requirement, a branch pipe design assembly consisting of a shoe tee connection, ball joint, straight pipe section, slip joint, flexible pipe section and suction hood is shown in Fig. 1. The ball joint will act as a horizontal position adjustment. The slip joint will adjust the vertical position and the flexible pipe will turn the suction hood to the required angle.

The recommended design air volume requirements for an exhaust system of this type is dependent on the distance of the hood from the welding operation. If the exhaust hood is 6 in. from the welding operation, figure 250 cfm per sq ft of hood face opening. For 12 in., the figure will increase to 800 cfm. From these figures the diameters of the graduated main duct and branch duct can be calculated and the fan requirements and motor hp determined.

The following is the step-by-step procedure for solution of this month's pattern problem.

For Simplified Method Drawing, Fig. 3—

a) Draw the extended horizontal center line CL, and on the left end of this line establish point E′.

b) Working from point E′ measure 1¼ in. to the right and establish point O′. From point O′ measure along the horizontal line ¾ in. to the right and establish point A′.

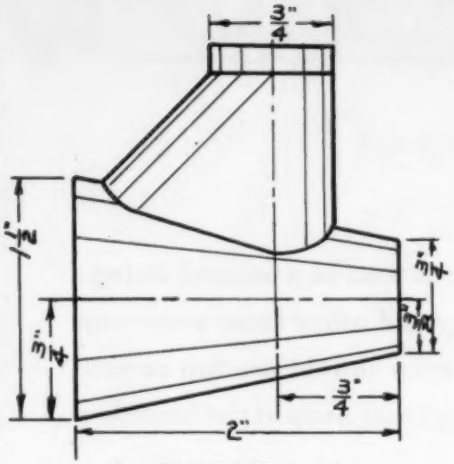
c) Through points E′ and A′ draw lines perpendicular to and extending on both sides of the center line. From point E′ measure ¾ in. (see Fig. 2L) above and below the center line and mark the points E and Y′ as shown. From point A′ measure ⅜ in. (see Fig. 2L) above and below the center line and mark the points A and Z′ as indicated. Draw lines from points E and Y′ through points A and Z′ to intersect the center line at R′.

d) From O′ draw a line perpendicular to and above the center line, measure 1⅜ in. (see Fig. 2R), and mark the point O. Through point O draw a line perpendicular to and on both sides of line O′-O. Measure ⅜ in. to the right on the horizontal line and establish point 7. Measure ¾ in. to the left on the horizontal line and establish point 1. Add the given 3/16 in. collar length above line 1-7.

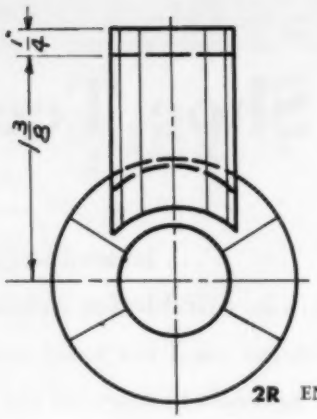
e) From point 1 draw a line at 135 deg to line 1-7, to intersect line E-A on the taper. Mark this point T′. From point 7 draw a line perpendicular to line 1-7 to intersect line E-A on the taper. Mark this point J′.

f) From point O on line 1-7 as center and radius ⅜ in., draw a half circle above line 1-7. Divide the half circle into six equal spaces. Starting at point 1, number the points 1 to 7 inclusive. Through points 4, 5, 6 and 7 draw extended lines parallel to line O-O′ and terminating at line Y′-Z′. From points 2 and 3 draw lines parallel to the center line to intersect line 1-7 and from these intersection points draw extended 135 deg lines parallel to line 1-T′.

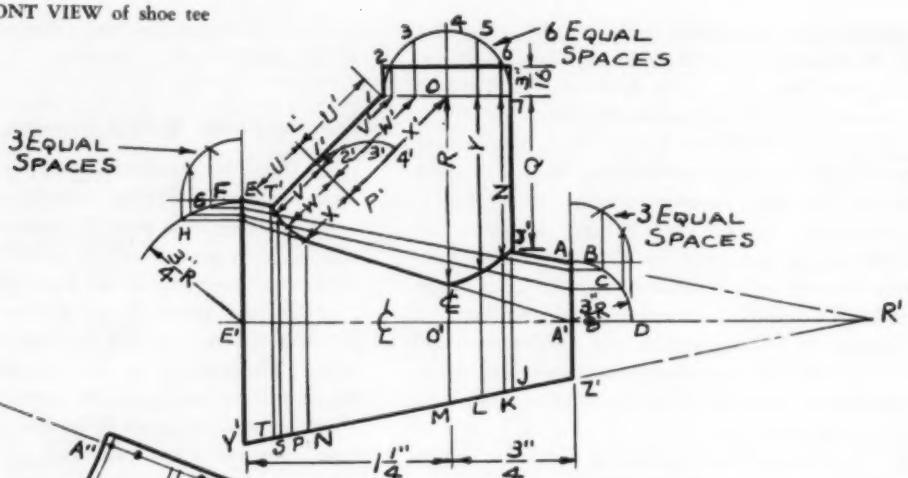
g) Extend lines E-Y′ and A-Z′ above points E and A. With E and A as centers and the shoe tee radius ⅜ in.,



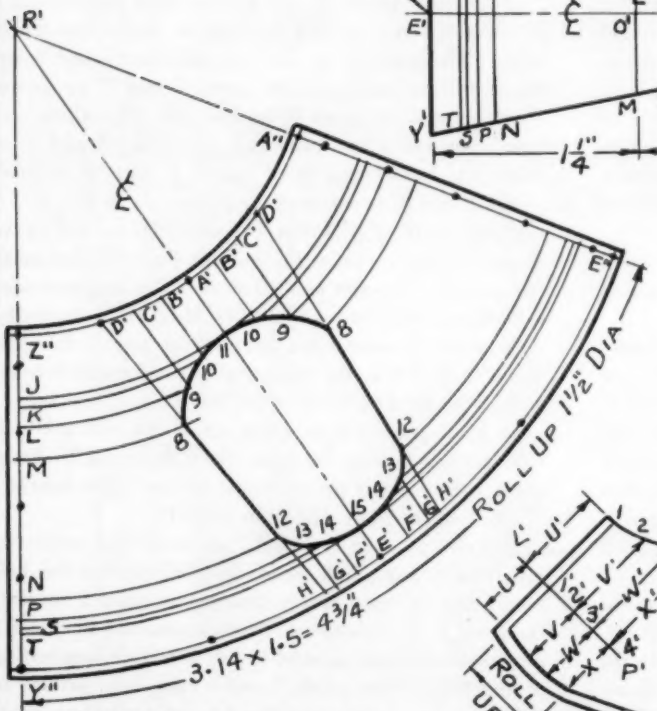
2L FRONT VIEW of shoe tee



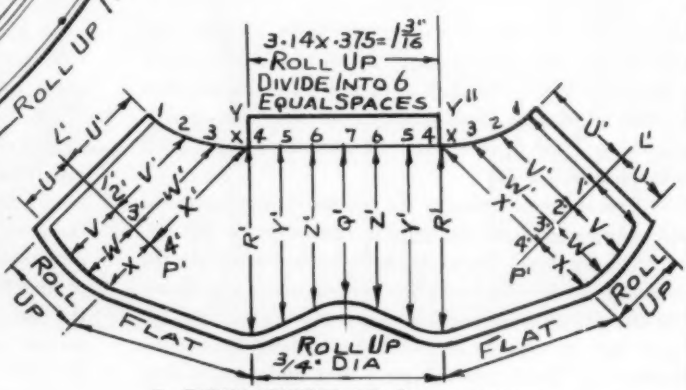
2R END VIEW of shoe tee



3 SIMPLIFIED LAYOUT of the taper and shoe tee



4 DEVELOPMENT OF taper pattern with cutout



5 DEVELOPMENT OF shoe tee pattern

draw 90 deg arcs as shown, and divide both arcs into three equal spaces. With point A′ on line A-Z′ as center and radius A-A′, draw a long arc to the right. Through the three equal points found when point A was used as a center for the 90 deg arc, draw lines parallel to line A-Z′ to intersect the arc created when point A′ was used as center, and mark the points B, C and D. From points B, C, D draw lines parallel to the horizontal center line and intersecting line A-Z′. With point E′ on line E-Y′ as center and radius E′-E draw a long arc to the left of point E. Through the three equal points found when point E was used as center for creating the 90 deg arc, draw lines parallel to line E-Y′ to intersect the long arc, and mark the points F, G and H. From points F, G, H draw lines parallel to the horizontal center line to intersect line E-Y′. Draw lines from the intersecting points on line E′-E to the intersecting points on line A′-A.

h) Draw the line P′-L′ at 90 deg to line 1-T′. This line can be positioned at any point on line 1-T′. Measure the distances from line 1-7 to points 4, 3 and 2 on the half circle, and working from line P′-L′ transfer these lengths, as shown, to the corresponding diagonal lines (drawn in step *f*) and mark the points 4′, 3′, 2′. Through these points draw the developed line 1′-4′.

i) Mark the diagonal lines from line P′-L′ to line 1-7 as U′, V′, W′, X′. Mark the lines from P′-L′ to the taper intersection line as U, V, W, X, and designate the vertical lines from points 4, 5, 6 and 7 to the taper intersection line R, Y, Z and Q.

j) Use the developed lines to outline the fitting by drawing through points E, Y′, Z′, A, J′, 7, 1, T′ and E. Also outline the taper intersection by drawing through the points where lines Z, Y, R, X, W and V cross the lines drawn in step *g* from line E′-E to line A′-A.

k) From the intersection points of the shoe tee and the taper, draw lines perpendicular to the center line and intersecting line Y′-Z′ at J, K, L, M, N, P, S, T.

For Taper Section with Cutout, Fig. 4—

a) Draw an extended vertical line and establish the point R′.

b) Set a compass at line length R′-Y′ on Fig. 3 and with point R′ (Fig. 4) as center, draw a long arc from the vertical line and to the right. Where the arc intersects the vertical line, establish point Y″. Calculate the required length of the arc by multiplying the large end of the taper diameter (see Fig. 2L) by constant 3.14. Thus, 3.14 × 1.5 equals 4¾ in. From Y″ measure arc length 4¾ in., and mark point E″. Draw a line from points R′ to E″.

c) On Fig. 3 set a compass equal to line length R′-Z′. With point R′ on Fig. 4 as center, draw an arc from line R′-E″ to line R′-Y″. Mark the intersecting points as A″ and Z″. This arc is equal in circumference to the ¾ in. taper diameter (Fig. 2L).

d) Bisect arc Y″-E″, Fig. 4, and draw the center line marked CL. Mark the intersection point of arc Z″-A″ and the center line as point A′, and the intersection of arc Y″-E″ and the center line as point E′. From the ¾ in. arc, Fig. 3, transfer arc distances from chords E, F, G, H to both sides of the center line of arc Y″-E″ (Fig. 4) and mark the points F′, G′ and H′ as shown. From the ⅜ in. radius arc (Fig. 3) transfer arc distances from chords A, B, C, D to both sides of the center line on arc Z″-A″ (Fig. 4) and mark the points B′, C′ and D′. Draw lines connecting points B′ to F′, C′ to G′ and D′ to H′.

e) From line R′-Y′ (Fig. 3) transfer to line R′-Y″ (Fig. 4) the radii lengths R′-J, R′-K, R′-L, R′-M, R′-N, R′-P, R′-S, R′-T. With R′ (Fig. 4) as center, draw arcs from the established points on line Z″-Y″ to line A″-E″. Where arcs J, K, L and M intersect lines D′-H′, C′-G′, B′-F′ and the center line A′-E′, mark the intersecting points 8, 9, 10 and 11, as shown. Where arcs N, P, S and T intersect lines H′-D′, G′-C′, F′-B′ and the center line E′-A′, mark the intersecting points 12, 13, 14 and 15, as shown. Through the developed points draw the outline of the cutout.

To Lay Out the Shoe-Tee Pattern, Fig. 5—

a) Draw a horizontal line and locate point X on this line. To determine the length of the horizontal line, multiply the radius of the shoe tee outlet (see Fig. 2L: half of ¾ in. equals ⅜, or .375 in.) by the constant 3.14. Thus 3.14 × .375 equals 1 3/16 in. Measure the distance from point X along the horizontal line and mark the new point X also. Divide this line into six equal spaces. Mark the points as 4, 5, 6 and 7 as shown, and from the points draw lines perpendicular to the line X-X.

b) From the left point X draw a line down and to the left of line X-X at a 135 deg angle. From Fig. 3 measure line X′ and transfer this length to the 135 deg angle line. Mark this point 4′. Through point 4′ draw a line to the left and at right angles to line X′. Mark the line P′-L′. From the ellipse, Fig. 3, transfer chords 4′-3′, 3′-2′ and 2′-1′ to line P′-L′, Fig. 5. Mark the points 3′, 2′ and 1′. Through points 1′, 2′, 3′ and 4′ draw lines perpendicular to and extending on both sides of lines P′-L′.

c) Working from line P′-L′ (Fig. 3) transfer line distance W′ to the line above point 3′ on lines P′-L, (Fig. 5). Follow the same method in transferring distances V′ and U′ to Fig. 5. Also the same procedure is used to transfer distances X, W, V and U below the line L′-P′ (Fig. 5).

d) From the right point X draw a line down and to the right of line X-X at a 135 deg angle. Follow the same procedure as outlined in step *b* for locating the points for the right half of the pattern.

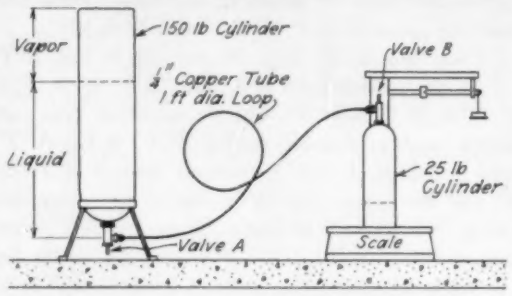
e) Transfer the vertical line distances Q, Z, Y, R from Fig. 3 to the lines 4, 5, 6 and 7 in Fig. 5, and mark the lines Q′, Z′, Y′, R′. Through the developed points draw the pattern outline.

f) From points X measure 3/16 in. above line X-X, locate points Y and Y″ and draw the collar outline through points X, Y, Y″ and X.

Add necessary seam allowances and mark the patterns.

Techniques for

By S. W. Reid
Air Conditioning Engineer
Gilbert Associates, Inc.



PROCEDURE SUMMARY

1. Place large cylinder, valve down, on rack and small cylinder, valve up, on scale
2. If small cylinder has been emptied and is full of air it must first be evacuated to 29 in. mercury or better
3. Attach transfer line as shown between cylinders. Tighten nut at valve A. Open this valve and purge air from line with refrigerant. Tighten nut at valve B
4. Open valve B and allow refrigerant to flow into smaller cylinder
5. Set scale rider for desired amount of fill (which must always be less than full volume to allow room for liquid expansion) and stop flow when balance arm lifts
6. Heat large cylinder (not with open flame) or cool small cylinder to accelerate transfer

FIG. 1—CHARGING PROCEDURE for transferring liquid refrigerant from a storage drum to a service cylinder

THE DICTIONARY defines technique as the method of procedure essential to expertness. Practice in the art of air conditioning requires knowledge of a number of techniques. In these articles we have touched on many of them, some in general terms and others in substantial detail. This month we shall add to the latter with a discussion covering refrigerant charging and certain procedures associated with it.

The technique of refrigerant charging requires an understanding of how to handle refrigerants, how to prepare the system for adding a refrigerant charge, how to add refrigerant, how to tell when the charge is correct and how to remove refrigerant. While it is true that present day dealers in commercial and residential air conditioners do not have as many charging problems as did their earlyday counterparts, nevertheless, even the factory-produced packaged units need attention when they become damaged in transit or fail due to loss of charge for one reason or another.

In commercial and residential air conditioning work today, the dealer is mainly concerned with two refrigerants. These have the trade names "Freon-12" and "Freon-

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. . . in Mr. Reid's series of 20 articles (concluded in the May, 1954 issue). The basic operating characteristics of residential cooling equipment were described in detail.

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- **Zoning residential air conditioning (special problems, instructing home owner, etc.)**

Charging a Refrigerating System

Intricacies of the charging, evacuation, and reclaiming processes are outlined for the dealer looking for a better way to service his equipment

22" refrigerant. Both refrigerants belong to a group known as halogenated hydrocarbons which are characterized from a safety standpoint by their low toxicity, non-inflammability and non-explosiveness. These refrigerants, therefore, can be handled safely, provided care is taken to prevent liquid from touching the skin or the eyes.

Transferring, Removing Refrigerant

From the working standpoint, refrigerants must be handled in a manner which will prevent their contamination by dirt, air, moisture or other refrigerants. The dealer will usually find it most economical to buy the various refrigerants he needs in large drums holding perhaps 150 lbs or more.

From these he will refill various smaller, handier cylinders of the 10 or 25 lb size which the service men take to the job. The small cylinders should be well marked so they will always be used for the same type of refrigerant.

Special cylinders, also properly identified, should be on hand for collecting *used* refrigerant reclaimed from a system undergoing repair. *Used* refrigerant contains oil and sometimes scale and dirt. It should never be put into cylinders reserved for *new* refrigerant.

Basic to intelligent handling of refrigerants is an understanding of the contents of the refrigerant cylinder. Service men often refer incorrectly to a refrigerant-containing cylinder as a *bottle of gas*. Actually, the cylinder contains both vapor and liquid. The heavier liquid is always in the lower part. Opening the valve with the cylinder in an upright position will release vapor. This lost vapor will be replaced by more vapor which boils off from the liquid below. Opening the valve with the cylinder upside down so the valve is at the bottom will release liquid.

Transfer cylinders are usually filled directly with liquid in the manner shown in Fig. 1. Small refrigerating systems, on the other hand, are usually charged with vapor as will be described later. The maximum safe amount of refrigerant which should be contained in each size cylinder should be marked on the outside. This is always less than the full cylinder volume to allow space for the liquid to expand with increasing temperatures. A full cylinder could be subject to dangerous hydrostatic pressure.

The amount of refrigerant in a cylinder must be determined by weight. As long as some liquid remains, the pressure will be constant, except as influenced by temperature. The pressure in a closed cylinder at ambient temperature will be that corresponding to the ambient temperature as given in the refrigerant property tables for the particular refrigerant. If a closed cylinder of "Freon-12" refrigerant, for example, had been kept in a 70F room its pressure would be about 70 psig. In a 90F room the pressure would be 99.6 psig. Corresponding pressures for "Freon-22" refrigerant would be 122.5 and 170.1 psig respectively.

Preparatory Steps for Charging

With some understanding of the handling of refrigerant, we can turn our attention to the next phase of the charging technique — preparing the system. This phase is not necessary if refrigerant is merely to be added to an operating system. We shall assume, however, that we are confronted with either a new system or one which has been opened for repair work. Consideration must be given cleaning, leak testing and evacuation.

In the early days of air conditioning, the cleaning of a new system was a major problem. All components were assembled on the job. Many manufacturers took no special precautions to keep condensers, evaporators or piping and tubing clean. Even compressors, especially in larger sizes, had to be disassembled and cleaned of protective grease before they could be put into operation.

The picture today shows considerable improvement.

". . . the advantage of using properly treated components should not be lost through improper or careless assembly."

For the field-assembled system or for replacement purposes, manufacturers offer components which have been factory cleaned, dried and sealed with a charge of dry, inert gas. Many compressors are shipped complete with the oil charge, ready for operation. Even copper tubing for refrigeration service is cleaned, dehydrated and capped to seal out contaminants which might enter during storage or handling.

The greater respect for the value of clean, dehydrated components at the factory level has made system preparation easier for the installer. Pre-cleaning eliminates the necessity of blowing dirt and scale out of each component and then from the piping after it is complete. Dehydration shortens evacuation time and minimizes possible mechanical and chemical trouble from excess moisture in the system.

The advantage of using properly treated components should not be lost through improper or careless assembly. Dirty components must first be thoroughly washed with a degreasing solvent and then dried with clean compressed air. Dirt and burrs should be cleaned from the ends of all lines. Brazing of copper lines should always be done with oil-dry nitrogen flowing inside to prevent oxidation scaling. Atmospheric air with its attendant moisture should not be pulled into the system by operating the compressor with the suction line open. As a precautionary measure, strainers should be included in the system at two points — one in the liquid line and one in the compressor suction line. In new systems or systems which were open to air, a chemical drier should be placed in the liquid line to remove residual moisture. All of the above measures in the interest of system cleanliness will pay dividends in long, trouble-free operation.

How to Locate Leaks

The next step in preparing a system for charging is the pressure test. Leak testing is important, not only to conserve refrigerant, but also for safety reasons. The American Standards Association publishes an important code known as the *ASA B9.1 Safety Code for Mechanical Refrigeration*, which contains many industry-sponsored safety recommendations. This code is being made a part of many city building codes. Among its provisions is a section specifying minimum field refrigerant leak test pressures for any system of one horsepower or larger. These pressures are to be applied to all refrigerant containing parts other than those which have been factory tested.

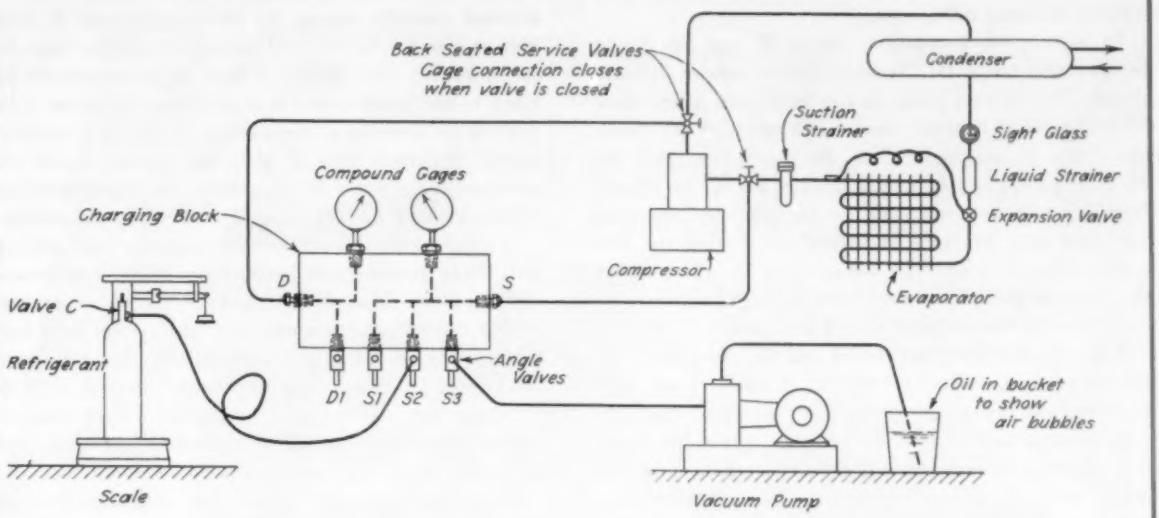
If application of full code pressures to a system is necessary (for example, 235 psig high side, 140 psig low side for "Freon-12" refrigerant), atmospheric air with a small amount of refrigerant as an indicator could be used. The pressures could be created by the system compressor pulling air in the suction side through a large drier containing silica gel or other drying agent. This practice is not recommended, however, because of the possibility of bringing moisture into the system in spite of the precautions.

A better method of obtaining necessary pressures is to use a dry, inert gas such as carbon dioxide or nitrogen (again with a small amount of refrigerant as an indicator). Cylinders containing these gases are under very high pressures. Reducing valves must be used, and extreme care taken to use no more pressure in the refrigerating system than necessary. It is good practice to apply pressure gradually, perhaps in increments of 50 psig, and to check for leaks between each step.

Leaks are detected by a halide torch which shows the presence of the halogenated hydrocarbon introduced as the indicator. The torch burns acetylene or alcohol. A piece of metallic copper is mounted in the flame. Freon vapor conducted to the normally faint blue flame by the exploring tube will cause it to exhibit a characteristically bright greenish blue color. If the leak is large and the space confined, it will be necessary to ventilate before the leak can be located, since the torch is sensitive to fairly dilute concentrations. A soap solution will show by bubbles where the vapor is escaping.

After the system has been found to have no leaks, it must be cleared of all air and/or other gases used during the assembly and test steps. If the system is under pressure, it must be purged down to atmospheric pressure (zero psig) before the vacuum pump is applied.

The manner in which the pressure is relieved will depend upon what access valves there are in the system. For purposes of this discussion we shall assume we are working with a system as shown in Fig. 2. The essential components are the compressor, water cooled condenser, thermal expansion valve and evaporator. As auxiliaries in the system we have included a liquid line sight glass, liquid strainer, suction strainer and suction and discharge service valves on the compressor. We are assuming that the service valves are of the back seating type, having gage connections. These are automatically opened and closed when the main valve ports are opened and closed. When the system is serviced, the gages or plugs in the auxiliary ports are removed, and high and low pressure lines are attached, running to ports D and S respectively of a device known as a charging block.



To Evacuate

Open valves S2 and S3; close valves D1, S1 and C (for faster evacuation, move line from D to S1 and open S1). Run vacuum pump until gages show 29 in. mercury vacuum or better and no bubbles appear in oil bucket; close S3, let system stand about an hour; check gages; restart pump; open valve S3 (bubbles in oil indicate a leak); repair leak; repeat evacuation.

To Charge

Close valves D1, S1, S2, S3; open valve C; start compressor; set scale rider for estimated required charge; open valve S2 until balance arm drops; close valve S2; observe system operation for correct charge (use sight glass, high pressure gage or superheat method); add or release charge as may be required. Apply heat (lamp or warm water) to service cylinder if necessary to move refrigerant into system.

To Reclaim Charge

Attach suction line of a small air cooled condensing unit to valves D1 and S1; open valves D1 and S1; close valves S2 and S3; attach evacuated refrigerant cylinder to liquid outlet of air cooled condenser. Operate until pressure in large system, as indicated by the charging block gages, is almost down to atmospheric pressure.

FIG. 2—EVACUATING AND ADDING a charge to a refrigerating system with the aid of a charging block, evacuating pump and service cylinder

The charging block is a handy service tool. It consists of a metal block into which are screwed all the valves and gages necessary for evacuating and charging a system. Its use is not essential to these operations since the same sequence of events can be achieved with individual valves and by connecting and disconnecting lines as needed. It will save a lot of time, however, and will enable a service man to do his job in an orderly fashion. The block shown in Fig. 2 consists of the block itself with its drilled passages as indicated by the dotted lines, two compound gages which show pressures above and below atmospheric, four small angle refrigerant valves and the suction and discharge connections previously mentioned.

In addition to making the connections at D and S we shall, at this point, also connect a cylinder of refrigerant to valve S2 and a vacuum pump to valve S3 in anticipation of the evacuation and charging procedures up to which we are leading.

Returning now to the system which we were ready to purge of the inert test gas, and assuming that the compressor stop valves are open so that both lines to the charging block are under pressure, we see that the pressure in the system will be relieved if valves D1 and S1 are opened. When this is done, both gages will indicate zero pressure, and we are ready to draw a vacuum on the system.

Evacuation is best accomplished by means of an auxiliary vacuum pump as shown in Fig. 2. It is possible under emergency conditions to use the system compressor; however, such practice may lead to trouble, as the compressor cannot pump all of the air and moisture from itself. In addition, it may run hot and without proper

cylinder lubrication if it is run for any length of time without the usual refrigerant.

To accomplish evacuation, valves S2 and S3 should be open and valves D1, S1 and C on the service cylinder closed. The vacuum pump is run until both gages show 29 in. or better mercury vacuum. Progress of the evacuation can be watched if the discharge line from the vacuum pump is run into a bucket of oil as shown. Bubbling will stop when all the air has been removed. The time may often be shortened by moving the line connected at D to valve S1 and opening S1, which allows the pump to pull air directly from the high pressure side as well as the low pressure side of the system.

When the bubbling has ceased and the gages show the proper vacuum, valve S3 (and S1, if used) should first be closed and the vacuum pump then stopped.

It is important to close these valves before the pump is stopped to prevent any possibility of oil in the pump being drawn back into the system. The evacuated system should be allowed to stand for about an hour to see whether unforeseen leaks cause the pressure to rise. After an hour, the pump should be started first and then valve S3 (and S1, if used) opened. If bubbles show in the oil, a leak in the system must be located and repaired, and the evacuation process repeated. If no leaks are found, we have completed the second phase of the charging technique and are ready to proceed to the third — how to add refrigerant; and the fourth — how to tell when the charge is correct.

Measuring the Correct Charge

In previous discussion we showed that quantities of refrigerant are measured by weight. Therefore, in order to know how much charge is being added, we will need a scale as shown in Fig. 2. The service cylinder is placed on the scale, and the rider is set to balance when the first estimated quantity has entered the system. The line connecting the cylinder to the charging block must be flexible enough so it will not materially affect the scale reading.

At the start of the process, valve C on the service cylinder will be open and valves D1, S1, S2 and S3 on the block will be closed. (The charging line to the cylinder was evacuated by leaving valve S2 open when the pump was running so it will not be necessary to purge it.) The compressor is started and valve S2 is then opened to admit refrigerant until the scale balances.

After the initial charge has entered, valve S2 is closed and the system is observed for a period of time to check whether the quantity is correct. There are several methods for determining this:

One method is using a liquid line sight glass as indicated in Fig. 2. Refrigerant should be added until there is no visible flow. A milky appearance indicates that vapor is mixed with the liquid reaching the expansion valve. This occurs only when there is insufficient liquid in the condenser to completely cover or seal the end of the liquid line from the condensing vapor.

Another method for determining the correct amount of charge utilizes the discharge pressure gage, which is watched carefully during the charging process. If it begins to rise for no external reason, the service man has an indication that the liquid level in the condenser has risen to the point where it is covering condenser tubes and taking them out of condensing service. This condition is also indicated by a drop in the leaving liquid temperature, since water in tubes below the liquid level will tend to subcool the liquid below condensing temperature.

A third method of charge determination especially applicable to systems with hermetically sealed compressors and capillary tubes is the check of the coil superheat. Where the various components of the system have been factory-selected for proper performance over a range of conditions, the system may be safely charged until the coil superheat (difference between coil suction temperature and the temperature corresponding to suction pressure) is 5 to 10 deg under normal load conditions.

If the initial estimated quantity of refrigerant was low, additional charge should be added in small increments by opening and closing valve S2. The refrigerant cylinder may be heated with a lamp or warm water (never a direct flame) if necessary to make the vapor flow. The final weight used should be recorded for future reference on a tag attached to the system.

Removing the Refrigerant Charge

The final phase into which we divided refrigerant charging technique — how to remove refrigerant — is usually important only in larger systems where a large quantity of refrigerant is involved. For small systems where the cost of losing it is not great, refrigerant is usually blown to the atmosphere. This could be accomplished in the system shown in Fig. 2 by opening valves D1 and S1. These valves should be cracked at first to reduce the pressure in the system gradually; otherwise, the oil in the crankcase would foam and much of it would leave with the refrigerant.

For the large system where the cost of wasting the refrigerant would be prohibitive, it must be withdrawn into cylinders and saved for recharging when the system is again in operating condition. To accomplish this, a small air cooled auxiliary condensing unit is attached to the main system. The suction line of the small compressor might be attached to valves D1 and S1 in Fig. 2. This compressor will withdraw vapor from the main system, condense it, and cause the liquid to drain into a refrigerant cylinder which is connected to the outlet of the air cooled condenser. The system will be discharged when the gages on the charging block indicate that the pressure has dropped almost to zero psig. The pressure in the main system should be left a little above atmospheric to preclude air when the system is opened for repairs.

Although many assumptions as to detail had to be made to limit the scope of this discussion of charging technique, the dealer should be able to select the essential practices which can be adapted to special variations of the problem.

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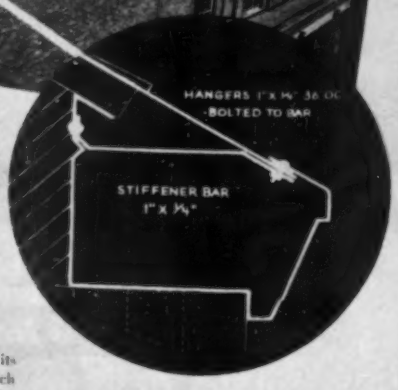

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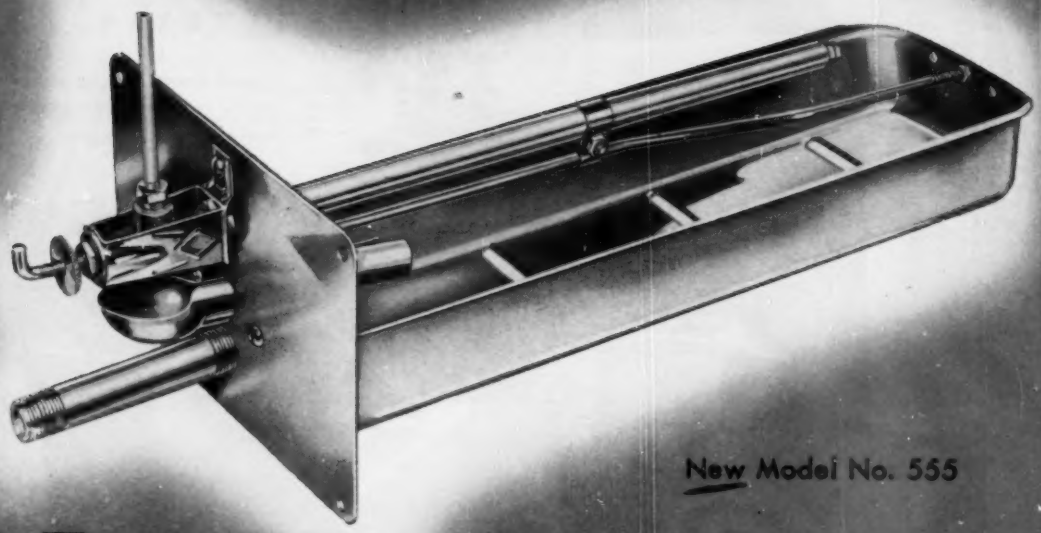

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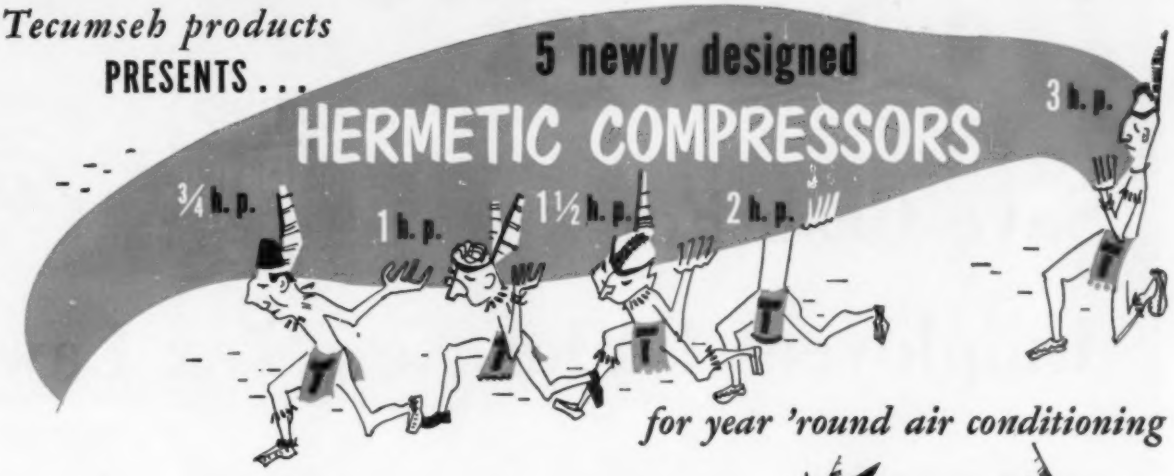

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Partner, J. K. Lasser & Co.

THE NEW Internal Revenue Code that became the tax law of the land during the summer of 1954 is, without doubt, the most sweeping revision of the statute books in years.

In the article published in November American Artisan, we explored how the new law, through its incentives and concessions, opens new tax benefits to business. This month let's see what it can do for employees, and investigate provisions which can raise workers' morale at relatively little cost to you.

This month, some of the important revisions will be highlighted. Your tax adviser will help you take advantage of new provisions of the law as it applies to your operation. The code is loaded with benefits; it's your responsibility to make the most of them.

Here are some of the ways the new law can help your employees:

Savings in Employee Benefits

Under the old code, workers did not pay tax on sickness or injury benefits from plans financed by their employers under contracts with insurance companies. But they had to pay on benefits received under plans that the employers financed themselves. Now that's been changed.

You can now arrange for your employees to get benefits, without tax, under a plan which you finance, provided that the benefit payments meet any of these conditions:

1) The payments are reimbursements for medical expenses incurred by the employee for himself, his wife or other dependents.

2) The payments are for permanent loss or loss of use of part of the body, or for permanent disfigurement of the employee, his wife, or other dependents. In this case, the payment is based on the nature of the injury and has no relationship to the length of time the employee is out of work; the payment is not for medical expenses. So the employee can deduct any medical cost he has in connection with his injuries, without having to worry about having them reduced by the amount of the payment.

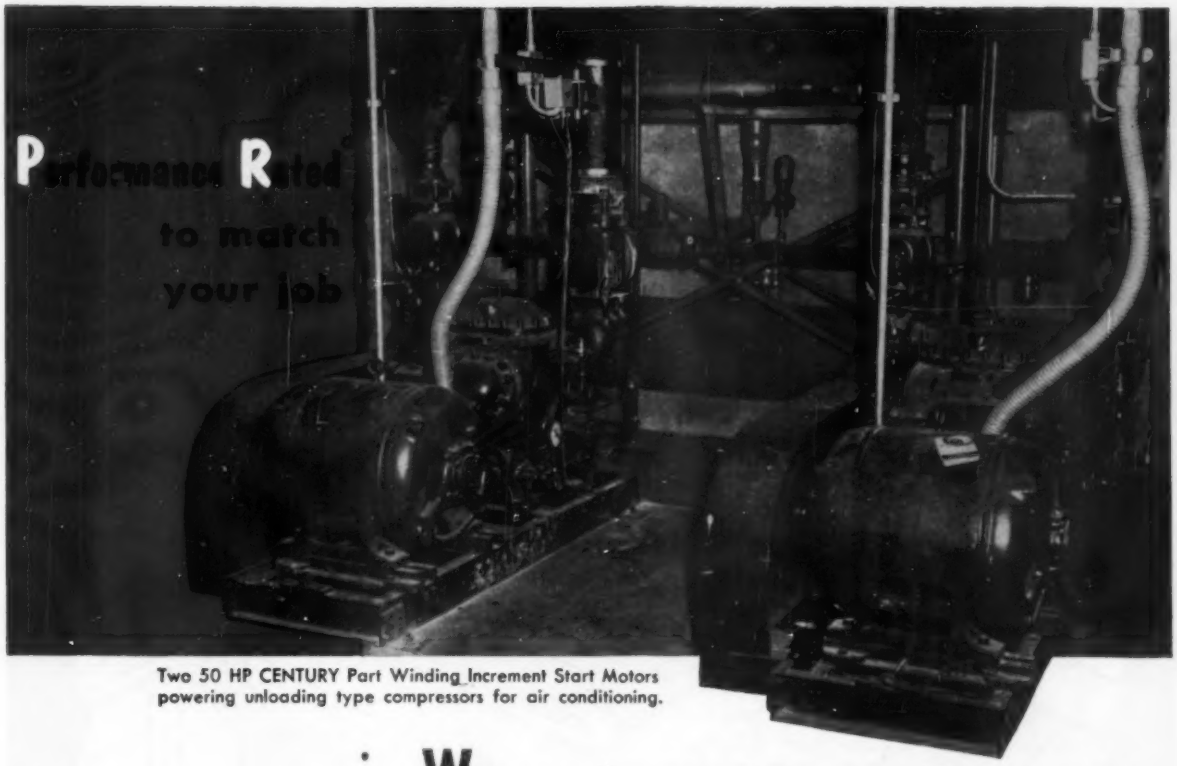
3) The payments are wages or for loss of wages for the period the employee is idle because of sickness or injury. The worker pays no tax on any amounts up to $100 a week of such payments. However, the exemption does not apply during the seven days of absence unless the absence from work is due to an accident, or unless the worker is in the hospital for at least one day during his absence.

Example: Jones is out sick for ten days. He is not injured and does not have to go to the hospital during that time. He gets payments for the full ten days. But payments are tax free for only three days.

Suppose, however, that on the eighth day, Jones is admitted to a hospital. He stays overnight and is discharged the next day. The payments for the entire ten days are tax free, based, of course, on the maximum of $100 a week.

Smith, on the other hand, is out sick, not in the hospital, for three days. On the fourth day he is injured. The injury keeps him out of work for five days more. He can't exclude payments for the first three days but he can for the next five — again on the basis of not more than $100 a week.

The old law said payments up to $5,000 by an em-



Two 50 HP CENTURY Part Winding Increment Start Motors powering unloading type compressors for air conditioning.

Here's how part winding increment starting works for you:

Motors of the increment starting type operate by electrically separating the motor winding into two parts. One half the winding operates when starting, delivering roughly half the normal starting torque, drawing about one half the normal starting current. After a few seconds the increment starting control connects the second half of the winding into the circuit delivering full torque and current.
The three step starter uses a series resistance to further reduce the current on the first step of the starter.

Where you need low starting current . . . you can save with

Century Part Winding Increment Start MOTORS

Starting large motors where there is a limitation on the amount of starting current may be done easily and inexpensively with CENTURY Part Winding Increment Start Motors and control.

Available from stock in all popular sizes, enclosures, and mountings. 1 to 400 HP polyphase.

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Because all popular CENTURY Motors have provisions for part winding increment starting, they are available from stock in the complete Performance Rated Century line.

Write for Bulletin 14-157 P.1, or call your nearby Century Distributor or Century District Sales Office.

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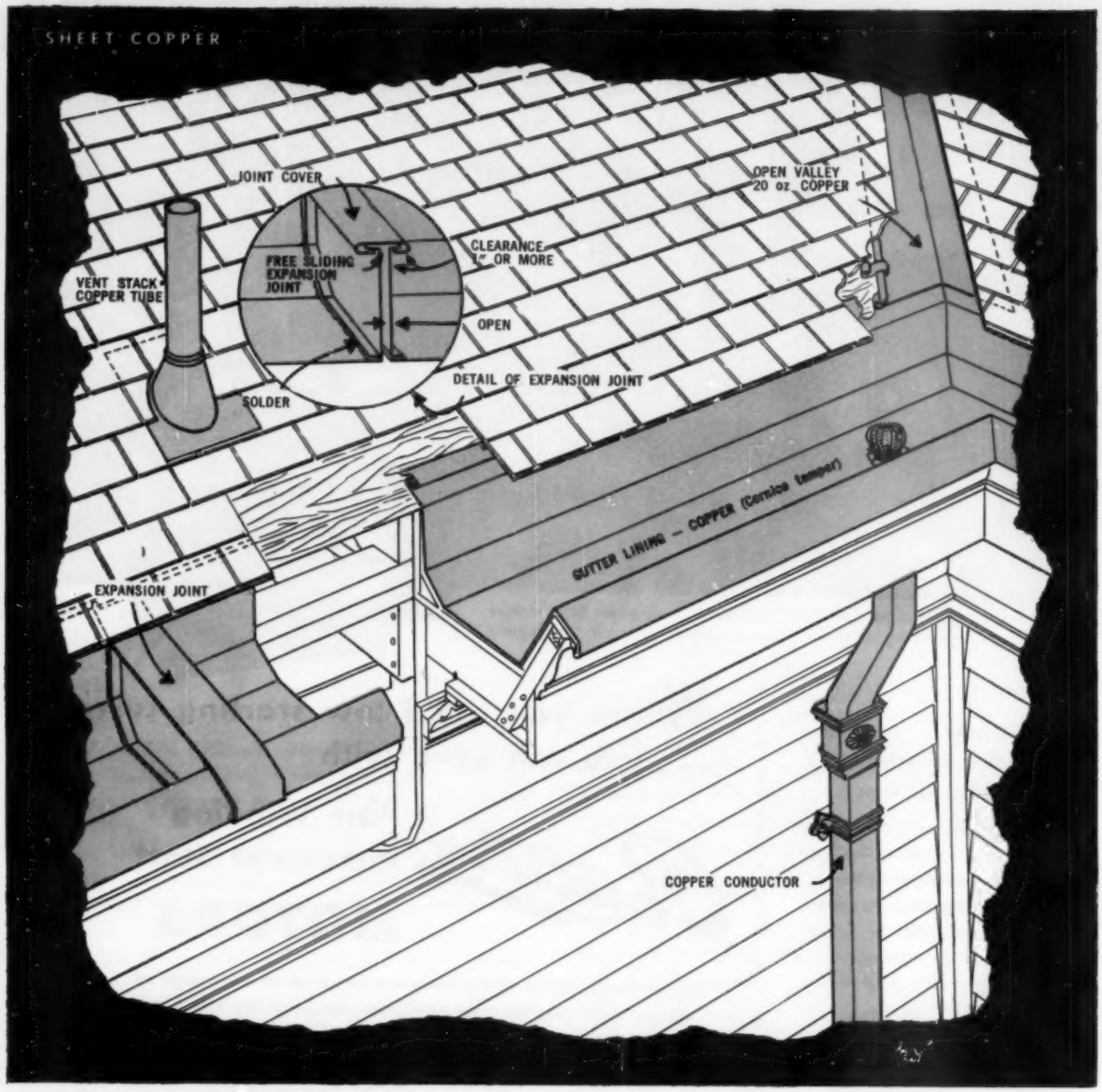


Built-in copper gutters: how to design and install them

Architects frequently prefer a gutter of built-in design so that the attractive architectural eave line of the house will not be hidden. Furthermore, a built-in gutter will handle more water and is not so easily damaged by sliding snow, ladders, etc.

A copper gutter of this type presents no problem to the experienced sheet metal craftsman when accepted standards of design and installation methods are followed. *Copper should be of a gage corresponding to the scale of the work.* Examples: a gutter like that shown on the drawing with a bottom 8" wide —a size common on houses—may be of 16 oz. copper. A bottom 12" wide calls for 20 oz. copper . . . 18", 24 oz. copper . . . and anything above, 32 oz. *Copper should be cornice temper. Gutters must have free sliding edges and expansion joints midway between the downspouts.*

If these points are kept in mind when you design or install this type of copper gutter you will be assured of a long-lasting, trouble-free installation. 5488

Do you have the FREE Anaconda file of drawings? Each drawing shows a new or improved way to apply sheet copper. Each is printed on a separate 8½ x 11 page, handy for quick reference filing. This series may be obtained absolutely FREE by writing for Portfolio S to **The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.**

For sheet and roll copper an

ANACONDA®

Distributor will serve you best

The new *Internal Revenue Code* is packed with benefits which can further cement employee-management relationships at little cost to the business

EXPLANATION OF new tax benefits available will boost employees' morale

ployer to the beneficiaries of a dead employee were tax free. But there had to be a contract calling for the payments. Now there's no tax — even without a contract.

Employee Options on Stock Purchases

The new law gives to the so-called *variable price options* the same favorable tax treatment provided for *restricted stock options*. Stock options no longer have to be in terms of a specified dollar amount; the option price can now be based on a formula. This means you have an easy way to protect your employees against a falling market.

Here's how you can work it: You peg the option price at a percentage (not less than 85 percent) of the value of the stock during a six-month period or some shorter period within that six months. The six month period must include the day on which the option is exercised. If the stock declines between the time the option is granted and the time the employee exercises it, he is fully protected against the drop. (Under a fixed option, he would have had to pay a specified dollar amount — at least 85 percent of the market value of the stock at the time the option was granted — regardless of what happened to the market price afterwards. The only requirement for the variable price option is that the employee pay at least 85 percent of the stock's market value at the time of granting if he exercises it then.)

It might be advisable to give your employees two stock options now — one for a fixed dollar amount, the other a variable price option. If the price of the stock goes up, the employee exercises the option with the fixed price. If the market value goes down, he exercises the variable price option. Either way, he gets the stock at the lowest possible price.

Meals and Lodging Not Income

The new law liberalizes the rules designating board and lodging as income. An employee has no taxed income if he gets them where he works, provided they are given him for the convenience of the employer. It makes no difference whether you intend the meals or lodging as part of the pay to workers. The only condition is that they are furnished on the premises, and that workers must take them as a condition of employment.

Salesmen's Expense Allowances Increased

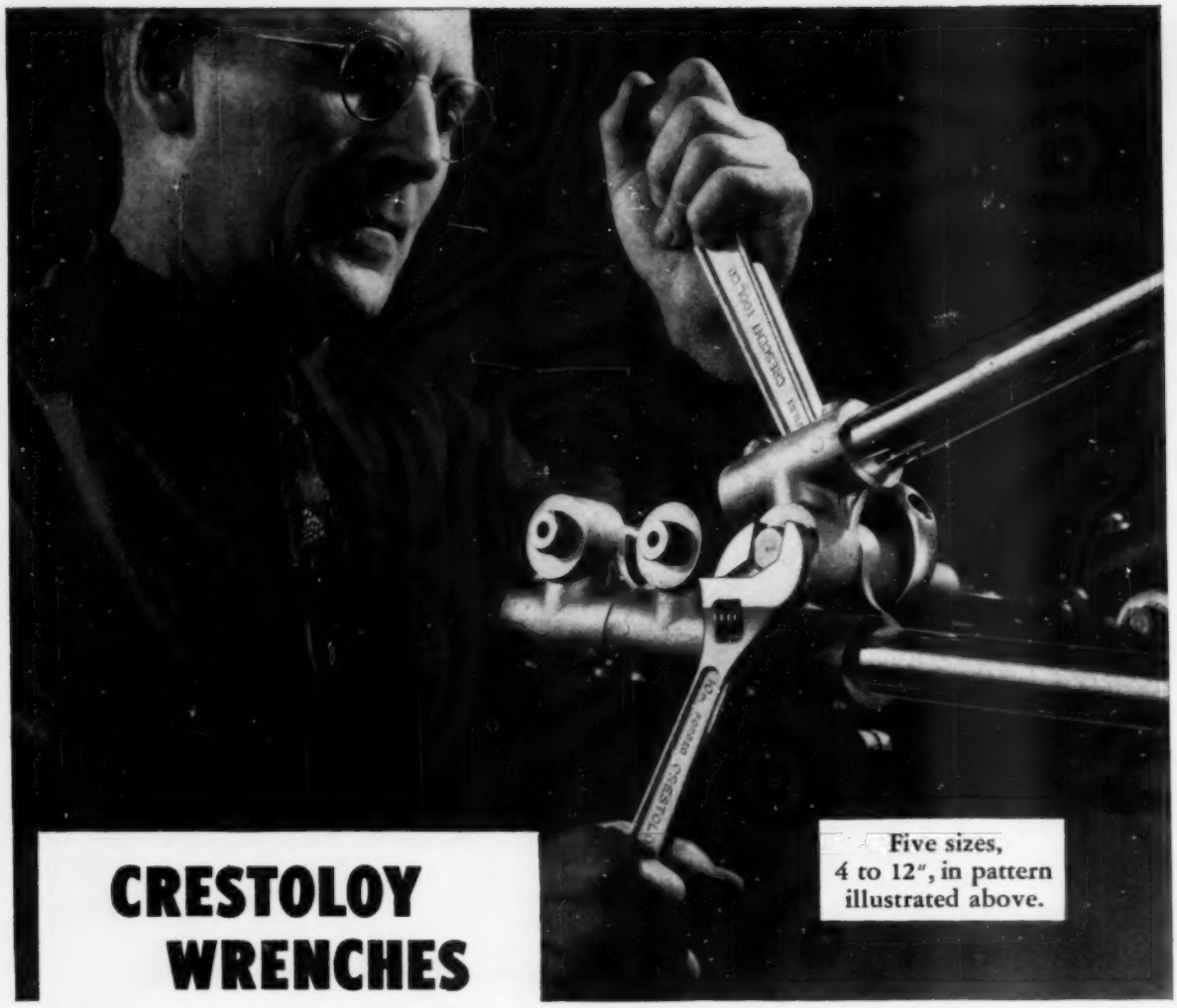
The law now allows for the deduction from gross income of local transportation costs and business expenses of outside salesmen. Employees formerly had to give up the standard deduction to get many of these expenses, and vice versa.

With the new changes you may want to give definite authorizations to your employees to make certain outlays for local transportation costs and sales expenses. That way they get support for the validity of their deductions, and it costs you nothing.

This is what the law now says: An outside salesman no longer must prove he is an independent contractor. An employee is considered a contractor for tax purposes. That means all expenses connected with his job are deducted from gross income to find adjusted gross income. In other words, he can use the standard deduction and still deduct for travel expenses, entertainment costs, secretarial help, telephone, telegraph, etc.

An employee can now deduct what he spends on local transportation costs from gross income to find his adjusted gross income. This means he can write off cab fares and tips, bus fares, subway fares and automobile

(This article continued on page 94)



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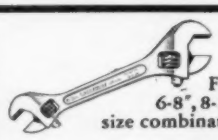
Forged from Crescent's own CRESTOLOY Steel, these fine wrenches are 200% stronger and 30% thinner than conventional adjustable wrenches. They are hardened by a selective induction process which guarantees longer life through a combination of surface hardness and interior toughness. Chrome plate finish. Sold by Industrial Distributors and Hardware Dealers everywhere.



DOUBLE END

Four sizes in 4-6", 6-8", 8-10", and 10-12" size combinations.

TAPERED HANDLE

Three heavy-duty sizes, 15", 18" and 24", have tapered handle as illustrated.

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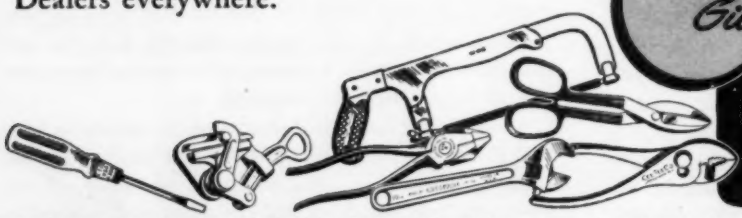
Give Wings to Work

Sign of the Artisan
Symbol of Excellence



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Talking about his profits, a heating man said this:
"I won't fool with unproven products. Service calls can eat you up. That's why I'm a Field man 100%. Why should I change? When you're talking the service calls saved and the fuel saved by Field you're talking dollars. And when dollars are at stake a few pennies more or less in the price of a draft control don't mean much."
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Visit Field Booth C. 24, I. H. & V. Exposition, Philadelphia, January 24-28
field
You have
picked
field
first
more than
15,000,000
times

New Tax Law Expands Social Security

(*Continued from page 91*)

costs. Naturally, these deductions are limited to the costs necessary in his job. Commutation is not deductible.

In addition to the employee benefits Congress packed into the new tax law, the administration this year has passed an expanded Social Security Act. Benefits have been increased and coverage broadened. Don't overlook their value to employee morale.

Here are two examples of what the new Social Security ammendments mean in dollars and cents:

Assume a man dies at 40, leaving a wife and two children, aged one and four. If he has been earning an average monthly wage of $350 or more, his family could receive over the years a total of $57,042 — tax free.

It breaks down like this: until the younger child is 18, the widow gets $15,530, the younger child $13,430. The older child gets a total of $10,500 over the years until he is 18.

After the younger child reaches 18, there is a cut-off in benefits to the widow. However, when she reaches 65, she again gets Social Security benefits. On the basis of her life expectancy at age 65 (according to the 1937 Standard Insurance Annuity Table) she will get a total of $17,582.

Even a retired childless couple — or a couple with no child under 18 — can do better than one might expect. Under the new law, a retired man and his wife (over 65) might collect a total of $37,112 — based on the average life expectancy at that age.

The breakdown: during the husband's life, he gets $19,532, his wife $9,766. After his death, his widow would collect $7,814 before she dies.

The annual Social Security payment received by this man and his wife thus comes down to $1,953. On face, that doesn't look like much. But don't forget that the capital required to produce that amount each year at 4% would be $48,825.

Graduates Enter a Lively Field

(*Continued from page 73*)

JOINT APPRENTICESHIP Committee and 39 apprentices observe the first anniversary graduation exercises in the Chicago area.

in a weak industry, but as long as there are interested groups such as you have in the Chicago area, there cannot be any weak apprenticeship programs.

"I take this opportunity to congratulate everyone contributing to the graduation of this class and responsible for the fine training program being conducted here."

A Field Well Chosen

Also from Washington came Frank Bonadio, Secretary, Building and Construction Trade Department of the American Federation of Labor, who started work as a sheet metal apprentice. In recalling the growth of the sheet metal industry during the past 30 years, he congratulated the graduating apprentices for having chosen a vocation in a field that is growing in importance.

Other speakers at the exercises were presidents of the contractor associations — Robert P. Johnsen, Jack Haines and William Magerstaedt — and A. H. Cronin, president of Local 73, who stressed necessity of the training program. Also at the speakers' table was Reginald E. Gotham of the Labor Department Apprenticeship Training Bureau.

Now, a dual zone air-cooled air conditioner really priced right to meet the mass market. Yes, here is your opportunity to join the great air conditioning parade with the most versatile unit ever produced.

The best news of all . . . the Clima-Twin-Zone air conditioner is priced so low that your retail price, including normal installation, will be the same or even less than window-installed units which do not have the capacity or air delivery efficiency.

Write today for full information on this hottest item in the cooling market!

BY THE 50-YEAR-OLD MAKERS OF FAMOUS PEERLESS HEATING AND AIR CONDITIONING

- Air cooled, 5 year warranted, hermetically sealed, highest quality equipment.
- Individually-controlled zone cooling . . . for economy, cooling may be directed to living area during the day and sleeping area at night . . . or in mild weather—entire home can be cooled.
- Small, flat-pan construction for ease and versatility of installation. Cabinet measures only 48⅜" long, 29⅜" wide, 19½" high.

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Please rush me full information on your new Clima-Twin-Zone air conditioner.

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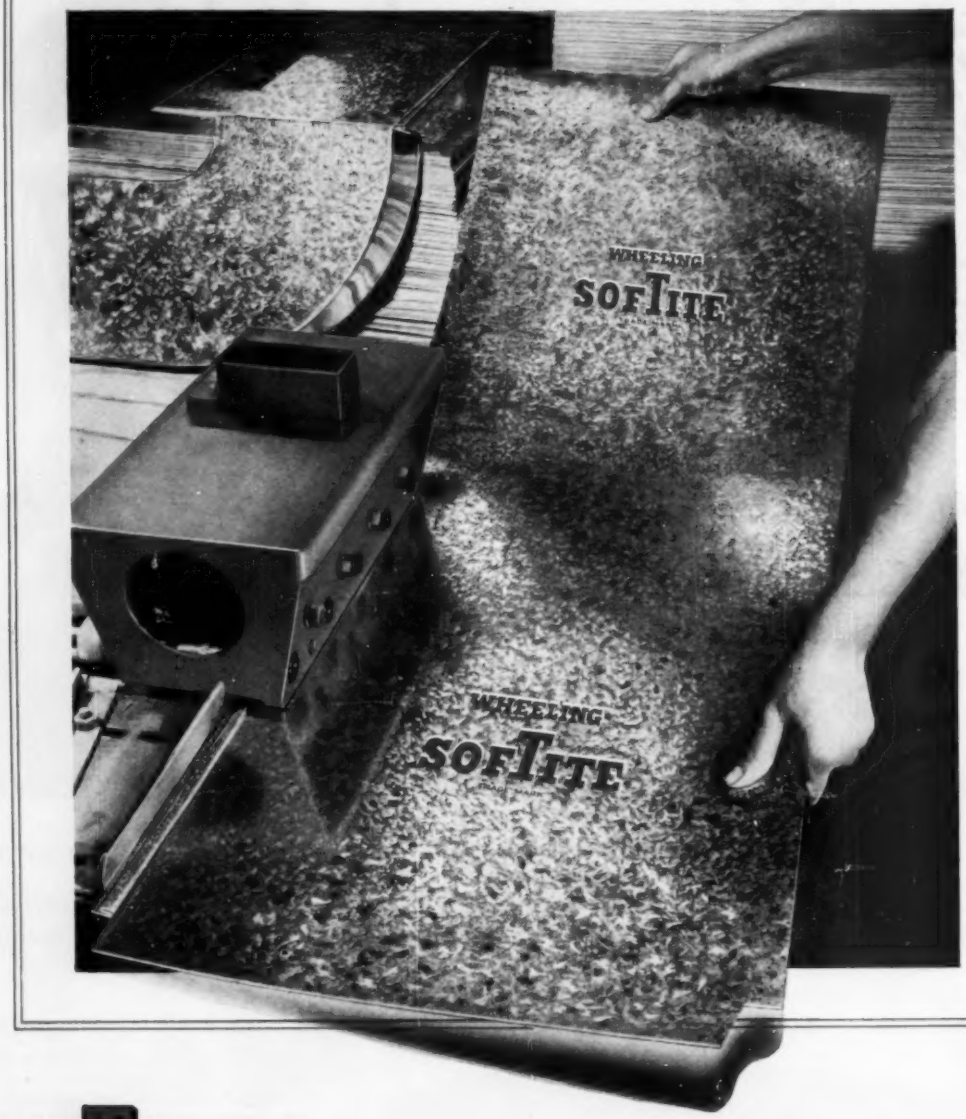
AA



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● *New* because they were developed and perfected by Wheeling engineers after years of research and experiment. Manufactured by a new process covered by U. S. Patent No. 2,647,305. *Different* because they combine a soft, ductile steel base with an incomparably tight zinc coating.

Ductile and tight coated to a most amazing degree, Wheeling SofTite Galvanized Sheets form freely and easily, without the customary distortion by strains in the zinc coating which cause separation of coating from the base metal. It permits every fabricating operation without flaking or chipping of coating.

Actual users have acclaimed Wheeling SofTite the ultimate in continuously coated galvanized sheets. See if you don't agree. Call or write the nearest office or warehouse for working samples.

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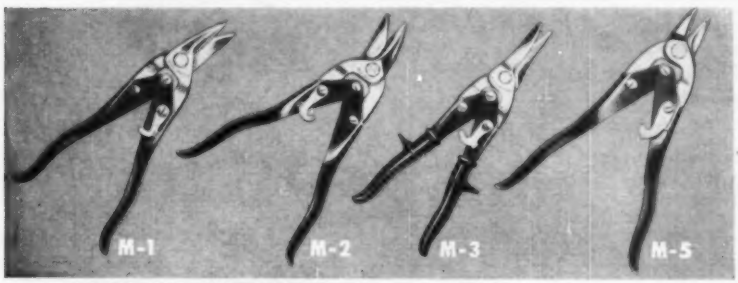
Louisville Minneapolis New Orleans New York Philadelphia Richmond St. Louis

Wheeling

"OUR SALESMEN PUSH WISS SNIPS BECAUSE THEY MAKE TOUGH JOBS EASY"

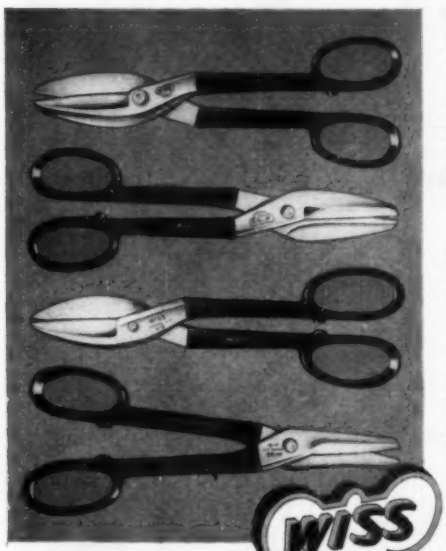
Irving C. Koval

Irving C. Koval and his brother, Harold N. Koval of the Rochester Oil Burning Systems of Rochester, New York give one big reason why their firm likes to feature Wiss metal cutting snips. There are several reasons why they are the choice of professional workers everywhere—why they sell better, with fewer returns. Wiss snips are produced largely by the handwork of skilled workers. Each pair is rigidly tested and guaranteed perfect. Bolts are set precisely to reduce wear and to increase cutting power with least effort.



WISS METAL MASTER SNIPS: Compound action design delivers amazing cutting power. These 10" snips cut with about one-half the effort required for standard 12½" snips. One edge serrated to prevent slipping. M-1 (cuts left) and M-2 (cuts right) are designed to cut the most intricate scrolls and circles. M-3 is for shallow arcs and straight cutting. M-5 Bulldog Heavy Duty snips are tops for notching, nibbling and cutting shallow arcs in sheet metal as heavy as 16 gauge.

Wiss inlaid blades are made of high carbon crucible steel welded to a hot drop-forged frame to provide the extra service demanded by professional workers.



WISS INLAID SNIPS
High carbon crucible steel welded to a hot drop-forged frame provides that *extra* service demanded by professional users everywhere. Six Straight Cutting sizes from 11½" to 17", including Bulldog Snips for notching. Three Combination* Cutting sizes, 12½", 13½" and 14½".

WISS SOLID STEEL SNIPS
For those whose requirements are less specialized than the professional user. Hot drop-forged of fine carbon steel, they meet or exceed government specifications. Four straight cutting sizes, 8" to 12½". Four Combination* Cutting sizes, 7", 10", 13" and 16" Bulldog Snips for notching.

*Made with straight blades, but ground and shaped so they readily cut curves and irregular shapes as well as straight.

J. WISS & SONS CO., NEWARK 7, NEW JERSEY

Manufacturers of Shears, Scissors, Pinking Shears, Metal Cutting Snips and Garden Shears

Wiss snips are hot drop-forged of the finest steels available.

Highly skilled craftsmen make final adjustments to assure that Wiss snips will cut perfectly for a long time.

A Warm Christmas Story

(With apologies to Clement Clarke Moore)

'Twas the night before Christmas; within and without
Every creature was freezing—our fire had gone out!
The burner was rusty, the grates had grown old,
The fuel bills were hung by the chimney, so cold.

Our heating was faulty ('twas 12 below zero)
When who should appear, but St. Nick'las (our hero).
And when Santa arrived behind Dasher and Dancer,
Our problem was solved; in his pack was the answer.

For our poor little house had grown colder and colder
Till he dropped into sight with that pack on his shoulder.
He was dressed all in fur from his head to his foot,
But his clothes were all tarnished with ashes and soot.

He spoke not a word but went straight to his task
And put in a *Sunbeam* (What more could we ask?),
And placing his finger on one little dial,
He gave us a wink and he started to smile.

Then our whole house warmed up in a wonderful way—
Why it might have been June, or quite possibly May!
"You'll be cozy all winter—you'll see what they mean
When they talk about comfort that's easy—and clean."

"And remember *cool* comfort when summer rolls round."
Then he turned and was into his sleigh with a bound.
But I heard him exclaim, ere he drove out of sight,
"Warmest greetings to all and to all a good night."

For more information, don't bother Santa — see your Sunbeam Dealer or Distributor

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THE OCCUPANTS of this 1600 sq ft home located in Madison, Wis., enjoy a 75 F inside temperature the year around

How a Heat Pump Meets Heating, Cooling Needs in Cold Climates

By Glydewell Burdick

Question: Can a heat pump, using 50 F well water as the heat source, do a good job of heating a home comfortably and at reasonable operating cost, under weather conditions of about −15 F design temperature, and about 7400 degree-days annually?

Answer: Yes, if three things are provided: 1) heat storage; 2) a means for varying the condenser temperature and hence the compressor head-pressure according to the varying weather during the heating season; and 3) continuous air circulation for heat distribution and ventilation.

A REPORT of the performance of a heat pump installation made in Madison, Wis., that has been designed to heat, cool and ventilate a seven room residence and of the problems encountered, should be useful to anyone who may be called upon to design or install air handling equipment for similar installations.

The system in my home, which began operation August 6, 1953, successfully and satisfactorily heated the house throughout the 1953-54 heating season, and has done a good job of cooling and dehumidifying the entire house during the summer of 1954. After living with and studying the operation of the heat pump for over a year, I want to continue to have one. It has cost less to operate than expected and has given a degree of comfort well beyond expectations.

With our long and widely variable winter weather in Madison, the matter of comfort is important to us. Our heat pump has given comfort fully equal to the best of the CAC fuel burning warm air systems.

GLYDEWELL BURDICK CHECKS the operation of the heat pump installation while an interested bystander watches

Extensive instrumentation of inside and outside temperatures, power requirements and operating cycles has provided complete information for contol settings and evaluation of overall costs of year 'round operation

The record of the use of power for the 1953-54 heating season was 0.10 kwhr per degree-day per 1000 cu ft of heated space. Of this, 0.08 kwhr was used for heat collection and storage and the balance of the 0.02 kwhr for distribution and ventilation. Part of this is chargeable to comfort if comparison is made with any package unit heat pump which delivers its full capacity direct to room air when operating.

Fortunately, the operating characteristics of the heat pump are such that the same auxiliary equipment necessary for topnotch heating comfort also makes possible materially increased efficiency of operation, attainable only with low average headpressures and long cycles of compressor operation.

When considering the equipment to meet the heating requirements for the lowest outside temperatures encountered during the winter, it appeared that a package unit liquid chiller refrigeration machine would solve the problem, if coupled with a heat storage tank to hold

COMPLETE INSTRUMENTATION of the heat pump installation has provided data on operating time, inside and outside temperatures, power requirements, etc

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CRISE

Solenoid Gas Valve

Higher Capacity

The Crise Solenoid Gas Valve has been designed to combine performance, ruggedness and simplicity for long, trouble-free service on all types of gas fired heating equipment. A soft seat is accurately centered by an improved design to assure positive shut-off and quiet operation. Corrosion-resistant parts make the Crise SV-100 and SV-110 suitable for use with all types of gases. Available in ½" and ¾" sizes, 24 V or 115 V and with or without a manual opener. Write for bulletin.

Visit our booth at the 12th International Heating and Ventilating Exposition

A Host of Features

- High Capacity
- Soft Seat Construction
- Quiet Operation
- Streamlined Design
- Positive Shut-off
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- Suitable For All Gases

CRISE CONTROLS DIVISION

ACRO MANUFACTURING COMPANY

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Are You BARRED

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BY A THREAD?

Hardened sheet metal screws are used in about every shop today — for dependable strength and time saving. But you'll miss the full pay-off in benefits from this popular fastener if *"softies"* and *"cripples"* turn up among the screws you use.

Screws can be "trouble-bent" in many ways. Like the thread faults listed here, most are invisible, but their effects show up clearly in job slowdown and customer complaints.

That's why P-K quality standards have been set so high — to make sure you get Sheet Metal Screws that are not only threaded, but headed, pointed, and heat-treated with one purpose in mind, to save you time and trouble on the job.

You'll find the type, size, and head style you need in the complete P-K line . . . several standard types and sizes in stainless steel. Ask for samples, Parker-Kalon Division . . . General American Transportation Corporation, 200 Varick St., New York 14. Chicago Warehouse, 4331 West Lake St., Chicago 24.

P-K STANDARDS PROTECT you against these and many other symptoms of screws that are "trouble-bent." They don't "get by" P-K inspectors — that's why *all* P-K Sheet Metal Screws can be "Guaranteed First Quality."

PARKER-KALON

The First **SELF-TAPPING SCREWS**

IN STOCK . . . see your nearby P-K Distributor

". . . it has cost less to operate than expected and has given a degree of comfort beyond expectations."

the water circulated through the condenser. By controlling the tank temperature, and hence operation of the compressor with an outdoor-reset thermostat, the average efficiency of the unit could be considerably improved. A two-speed blower motor, two circulating pumps to the air coil and an outdoor-reset thermostat that would permit constant air circulation and constant supply of heat throughout the house was used.

Adequate Water Supply Required

The area over which the house is located has an adequate supply of ground water at a temperature of about 51 F the year around. This water is pumped through the evaporator of the heat pump at a rate of about 22 gpm, enough heat is removed and transferred to the refrigerant to reduce the water temperature about 5 F, and the well water is then discharged into a lake in front of the house. It could be disposed of by returning it to the ground by means of a second well located at a sufficient distance from the intake well and possibly at a different level.

The refrigerant gas containing the heat removed from the well water is then compressed sufficiently to raise its temperature to the point where the heat will transfer to a closed system of circulating water (separate from the well water) that is circulated through the condenser. The condenser temperature varies between 85 and 110 F, depending upon the weather. The circulating water and the heat it contains is stored in a 300 gal insulated storage tank.

The compressor, well pump and circulating pump between the tank and the condenser of the heat pump are all controlled by an outdoor-reset thermostat system having one of its elements in the storage tank and the other exposed to the outdoor temperature. The outdoor thermostat takes into account both the outdoor temperature and the wind velocity. This arrangement makes it possible to vary the control point for the tank temperature in the range of 85 to 110 F roughly proportional to the heat loss of the house under the varying weather conditions. This control system is entirely independent of the room thermostats and only serves to keep the tank at the proper temperature.

Two Stage Control System

Under control of room thermostats adjusted for two different stages, water from the storage tank is circulated through an air coil by either of two small circulating pumps. Room air is circulated through the air coil and thus warmed and returned to the rooms by a duct system and blower driven by a two-speed motor, also under control of the room thermostats. The objective in this design was to anticipate in advance and continuously supply heat as well as ventilation to the space rather than to make up a heat loss sensed through thermostat action after the full loss had occurred — in other words, to avoid an *all or nothing* performance of the entire air distribution system.

All air outlets are on inside wall partitions near the ceiling and are served from branches from a main duct riser in the center of the house. Air returns are located in the floors near the outside walls. Most of the air outlets have sets of both horizontal (inside) and vertical (outside) individually adjustable louvers.

Our house is a two-story frame construction and has a floor area of about 1600 sq ft excluding unheated closets, with about 1000 sq ft on the first floor. The heated volume is about 13,000 cu ft. It was new in 1938, with a 1953 addition, and is tight and completely insulated. Double glass is used throughout except for a pair of French doors opening from the living room to an open porch. Design heat loss was 66,000 Btu per hr at −20 F, but it has actually been found to be about 60,000. There is no basement. The air handling equipment is located in a crawl space under the center of the house. The heat pump, tank and well pump are in a 4 ft deep concrete pit which is located under the new utility room at the rear of the house.

Constant Air Circulation Used

From our own experience, we heartily agree that constant air circulation is essential for comfort. This is particularly important in night time cooling, with outdoor temperatures below 75 F and humidity high. Running the blower on low speed continuously with the room thermostat controlling the pump circulating cold water to the air coil was not a solution; while the pump wasn't working, the air picked up moisture from the dripping coil and put it back into the house air, raising the humidity to an uncomfortable point. Therefore, a ⅛ hp blower, controlled by a manual switch, was installed in a bypass duct between a second floor air return and the main riser. This blower operates continuously whenever the cooling system is being used. A bypass around the air coil with an automatic damper and with the regular

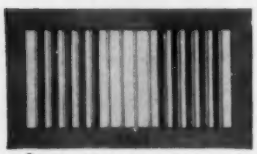
(*This article continued on page* 106)

Low-Cost . . . Attractive . . . Efficient

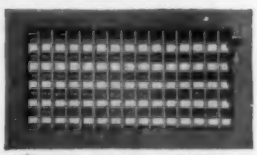
Streamliner Registers and Grilles for heating and air conditioning provide a minimum of resistance giving silent operation while obtaining maximum diffusion for high velocity installations.

Beautifully designed, Streamliners feature expert engineering and fine craftsmanship. Auer Registers are carefully inspected at each step of manufacture and undergo a thorough final check before shipment to guarantee perfect fit and operation.

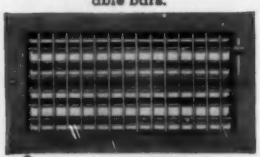
The Streamliner series includes models with single banks of adjustable bars, vertical or horizontal, also with a double bank of bars vertical in front and horizontal in back (or the reverse). Each beveled bar is quickly adjusted to any desired angle to control diffusion by use of an adjusting tool as illustrated.



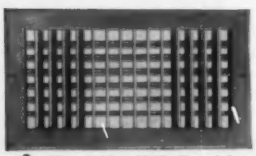
No. 1005 V. Grille with single bank of vertical adjustable bars.



No. 1005 V-HML. Register with multi-louvre back blades.



No. 1205 V.H.-HML. Register with double bank of adjustable bars and multi-louvre back blades.



No. 1205 V.H. Double deflection grille, with 2 banks of bars, front vertical, rear horizontal.

There is an Auer Register to fill any heating or air-conditioning requirement. Write for full details.

Auer REGISTERS and GRILLES

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American Artisan

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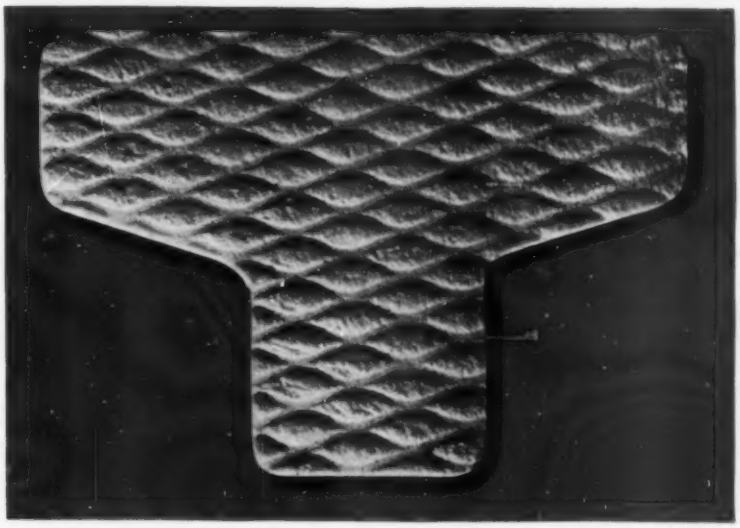
Standardize on Skuttle — The line is complete — Parts are interchangeable

A humidifier is frustrated if it hasn't good evaporating plates

Patented Vapoglas Plates absorb more water • Diffuse more • Last longer without clogging • Standard in Skuttle Humidifiers



Note these test results on evaporating plates

Type Plate	Dry Weight Ounces	Wet Weight Ounces	Gain Dry to Wet*	Open Space in Plate#
Patented Vapoglas	1.5	3.6	140%	83%
Plate B	3.4	4.6	38%	55%
Plate C	1.67	2.61	54%	42%
Plate D	9	11.5	28%	27%

Drop test on concrete floor shows Vapoglas has greatest resistance to breakage.
*Indicates water absorption.
#Indicates resistance to clogging with water chemicals.

No humidifier can be any better than its plates—because the plates are the only elements that can do any humidifying. The rest of the device exists merely for supporting the plates and supplying them with water. Any humidifier is thwarted of its life purpose unless it has good plates.

BEST PLATES — A MUST

Hence it is of first importance that the humidifier you install be equipped with the best in plates—that the plates you use for replacement be the best.

VAPOGLAS — THE BEST

By every test, Patented Vopoglas Plates are the best. They absorb 73% more water, (pound for pound). They have 83% open space (to resist clogging) against 55% for the next best. They are lighter, sturdier. Drop tests show they resist breakage better.

Patented Vapoglas Plates are made of pure glass wool compressed and stabilized under heat.

All Skuttle Humidifiers in which plates are used have Vapoglas plates.

If it's a Skuttle—it's a better Humidifier with better plates.

For Any Warm Air Heater There's A Skuttle Humidifier That Does It Better.

6973

Skuttle

MANUFACTURING COMPANY
MILFORD, MICHIGAN

Heat Pump Provides Continuous Ventilation

(*Continued from page* 103)

blower operating continuously on low speed probably will accomplish the same purpose.

The system has given a remarkably satisfactory and superior degree of heating comfort, together with low rate continuous ventilation in all but very mild weather, which — at least to my family — has been delightful and much preferred over the usual intermittent blower operation spaced by *dead air* periods. With the ⅛ hp blower now installed, this heating season we'll have constant ventilation even during mild weather.

You have to move a lot of low temperature air to heat a house, and in the planning stage I was concerned that with a heat pump set at design maximum, the difference between blower on and blower off would inevitably be a big difference; also, cooled air standing in the ducts and coming out ahead of the heated air on blower start-up would prove to be uncomfortable.

We now know from experience that the changes between blower low speed and blower high speed are hardly noticeable and certainly are not objectionable. Also, from actual trial for two days in February (we wouldn't put up with it longer), we know that high speed blower operation only, controlled in the room thermostat, is distinctly inferior to the two-speed operation even though aided by storage tank temperature modulation by the outdoor-reset control system. The high speed blower operated 23½ hours out of those 48 hours, as against only 8½ hours that the compressor itself operated.

I think you will understand my initial concern about 90 F air and lower cut of air outlets being acceptable. I'd say that for more than two-thirds of the heating season the air has been no warmer than that and has been as low as 80 F at times. I was agreeably surprised to find that with our high wall outlets this caused no trouble whatever. A pertinent fact is that the tight, well insulated house holds down the volume of air that has to be circulated in order to distribute the required amount of heat.

Because of the low discharge temperature of the supply air, it seems to have a different *feel* than air in a house heated by other types of heating systems. Perhaps a good description of the air is *springlike*. We ran room temperatures at about 72 to 73 F in September and October, 1953 against our previous temperatures of 75 or 76 F and were a bit chilly at times. Since then, room temperature has been controlled at about 75 F straight through, day and night, and this has been an entirely comfortable temperature.

Another point of concern was the noise of compressor operation. I am glad to report that, with reasonable precautions to avoid transmission of vibration through the piping and mounting the machine on a concrete base, this is no problem at all. Suitably enclosed, noise can be reduced to the point where it won't be noticed beyond the room where the equipment is located. We have tried it both ways and found that an enclosure was not essential for noise control. However, enclosures do increase the percentage of total heat output which is transmitted to the storage tank, and in some locations that might be a considerable advantage.

With the storage tank, compressor operating cycles can be held under 12 per day on the average and the operating time per cycle maintained for 35 minutes or longer. During mild weather I observed from 10 to 14 cycles of the room thermostat and low speed blower for each compressor operating cycle. With this same close control of room temperature, if the compressor were controlled by the room thermostat, the compressor operating time would have been about three minutes per cycle, assuming the same efficiency. One can easily predict the effect that short cycle operation would have had on the actual efficiency, plus wear on the machinery.

Changeover from heating to cooling is accomplished simply by valving the well water to the condenser instead of to the evaporator, and valving the circulating water to the evaporator instead of to the condenser. Compressor control is switched to a cooling thermostat in the tank and the blower and air coil pump control is switched to the cooling thermostat in the living room.

Current Wage Rates Paid Sheet Metal Workers

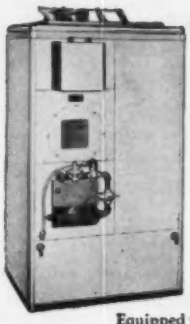
Sheet Metal contractors interested in bidding on jobs located in cities other than where their businesses are established will find the rates of pay for sheet metal workers useful in calculating their bids.

The following information has recently been made available by the U. S. Department of Labor. The wage rates shown are based upon a 40 hr week and do not include any fringe benefits.

The following rates are effective as of November 1, 1954, except for Cincinnati, which became effective December 1:

Chicago	$3.10	Detroit		Peoria	3.10
Cleveland	3.25	Agreement A	3.12½	St. Louis	3.25
Columbus	2.85	Agreement B	3.00	St. Paul	2.87½
Dayton	2.90	Grand Rapids	2.75	Toledo	2.93
Des Moines	2.82½	Indianapolis	2.95½	Cincinnati	3.05
Kansas City, Mo.	3.06½	Louisville	2.75		
Milwaukee	2.80	Minneapolis	2.77½		
Omaha	2.67½				

NOW! Your business can be BIG BUSINESS 12 months of the year with MONCRIEF'S



Equipped to burn Gas.

Front of Year 'Round Air Conditioner that heats in winter . . . cools in summer.

Same unit equipped to burn Oil.

Moncrief will open up for you greater year 'round profit opportunities than ever before with the addition of 3 NEW series of air conditioning units. These new units round out the biggest, most complete line of equipment in Moncrief's 60 years of outstanding leadership. And you get the "PLUS" of Moncrief's extra features and flexibility!

1. With MONCRIEF cooling equipment you offer greater efficiency with two, independently operating compressors that provide automatic two-stage cooling — thermostatically controlled to meet all types of humidity and temperature conditions.
2. With MONCRIEF heating you give a choice of burning either gas or oil with the same satisfactory results from tested and approved units.
3. With MONCRIEF cooling you give a 5 Year Protection Plan on the complete refrigeration circuit.

With MONCRIEF, dealers will have the greatest opportunities to meet all the demands of today's and tomorrow's building market. The time to get started is NOW. So see your MONCRIEF jobber today! He's got the GREATEST YEAR 'ROUND PROFIT OPPORTUNITY EVER OFFERED!!

NEW...

5 TON YEAR 'ROUND UNITS

A complete heating and cooling combination housed in an attractive cabinet. Approved for burning either gas or oil with the same operating efficiency. Heating capacities will be 140,000, 175,000 and 210,000 B. T. U.

NEW...

COUNTERFLOW YEAR 'ROUND UNITS Available in 2 Sizes

2 Ton Cooling with 100,000 B.T.U. Heating input. 3 Ton Cooling with 140,000 B. T. U. Heating input. A choice of air or water cooled condensers. Heating elements approved for either gas or oil.

NEW...

REMOTE UNITS WITH AIR COOLED COMPRESSORS

Available in 2 Sizes — 2 Ton and 3 Ton. Air-cooled Condensers eliminate water problems. For a SPACE SAVING, COST SAVING cooling installation in garage, porch or attic.

A Summer Air Conditioning Unit installed to operate in conjunction with a Winter Air Conditioning installation.

The Summer Cooling Unit with Blower for installations where furnace blower is inadequate.

The self-contained Space Cooling Unit with self contained Blower and discharge grille.

THE HENRY FURNACE COMPANY

Medina, Ohio

HEATING AND AIR CONDITIONING UNITS — MONCRIEF — FURNACE PIPE AND FITTINGS

YOU AND THE LAW

Who Is Responsible For Electric Current Supply?

Make sure the equipment or service you supply will meet the specific requirements of the customer who solicits your advice

By Albert W. Gray

CHECK THE AVAILABILITY of electrical power before installing equipment or quoting final sale price

A PHYSICIAN in one of the southern states purchased an air conditioning unit for his office. When the unit failed to reduce the temperature sufficiently, a second unit was substituted. For two weeks the dealer tried unsuccessfully to reduce the temperature as he had agreed, but this equipment required 220 volts while the current available varied from 180 to 210 volts.

The purchaser demanded a refund of his payments in return for his surrender of the equipment. This the dealer refused to do, and sued for possession of the air conditioning equipment. The purchaser's defense was that the unit had failed to perform the work for which it had been purchased although it was impliedly warranted as fit for that purpose.

Albert W. Gray, author of this article, has had over 20 years' experience as an attorney in the courts of New York City. He has written widely on legal matters and is the author of The Family Legal Adviser.

Parallel Case

The dealer appealed a decision in a justice's court in favor of the physician. The appellate court in its decision referred to a similar case governed by the same principles of law.

In this case, oil well drillers had relied on the judgment of a dealer in oil well supplies in overcoming a water leakage. They had told the dealer frankly that they were not familiar with the best methods in that locality for controlling the leakage.

The dealer assured the purchasers they could stop the water with equipment he would sell them. They followed his advice, bought the equipment and experienced the same lack of success as did the physician with the air conditioning unit. When the oil well supply dealer sued for the price of his equipment, the court said of circumstances such as these, in which the buyer relies on the skill and judgment of the seller:

"Where an article is sold for a definite purpose which is made known to the seller, and the seller represents that the article will perform that particular purpose, there is a warranty of fitness which protects the purchaser and for which the seller is liable in the event the article fails to do what it was sold to do."

Implied Warranty Defined

The Uniform Sales Act, which has been adopted in most states, provides:

"There is no implied warranty or condition as to the quality or fitness for any particular purpose of goods supplied under a contract to sell or a sale except . . . where the buyer, expressly or by implication, makes known to the seller the particular purpose for which the

BERGER Conductor Pipe and Gutters made from TONCAN IRON

UNEXCELLED IN THEIR PRICE CLASS FOR LONG LIFE and TROUBLE-FREE SERVICE

Berger fabricates a complete line of ready-to-use roof drainage products from Toncan Iron. It is the Republic sheet metal that resists rust better and outlasts all other ferrous materials in its price class. For this reason, it provides long life and trouble-free service under all weather conditions.

Berger Conductor Pipe and Type "K" Gutters are formed in long lengths on machines that never vary. Each length is accurate and true to size. Joints fit snugly. Installation is easy and fast because each piece is uniform.

See your jobber for the complete line of Berger Roof Drainage Products made of rust-resistant Toncan Iron.

BERGER TONCAN DRAINAGE PRODUCTS include: plain round, round corrugated, and square conductor pipe; "K" Gutter; SnapTite Eaves Trough; ridge roll; roof valley; flashing; plus fittings, hangers and accessories.

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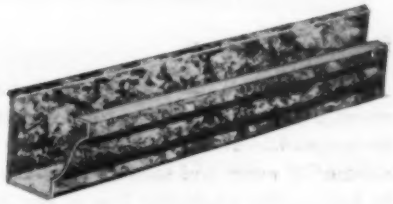


Berger
REPUBLIC STEEL
ROOF DRAINAGE PRODUCTS

goods are required, and it appears that the buyer relies on the seller's skill or judgment . . . there is an implied warranty that the goods shall be reasonably fit for such purpose."

In a lawsuit for damages from the sale of goods unfit for the purpose for which they were intended, the Federal Court said of this statute and its predecessor, the old common law rule which required a buyer to look out for himself:

"The Uniform Sales Act has now materially modified the common law rule as to implied warranty of fitness. The maxim that the buyer must look out for himself seems greatly to be restricted in its operation and limited in its domain until it can no longer claim the empire over the law of sales and is but a shadow of its former self.

"The raising of an implied warranty of fitness depends upon whether the buyer informed the seller of the circumstances and conditions which necessitated his purchase of a certain character of article or material, and left it to the seller to select this particular kind and quality of article suitable for the buyer's purpose.

"An implied warranty that an article will be fit for the particular purpose may be inferred from the contract to make or supply it to accomplish that purpose, because the accomplishment is the essence of the undertaking."

Purpose Is Important

The court added, "The purpose for which the buyer requires the article, and not the specific article itself, is the essential matter." This the Federal Court supplemented with a quotation from a decision by one of the state courts: ". . . But if the buyer goes to the manufacturer or dealer describing the kind of work to be done or the result he desires to accomplish, and such manufacturer or dealer professes to be able to supply an engine or machinery which will do it, and the buyer is thereby induced to give him the order therefor, then there is a warranty that the machine or thing so furnished is reasonably adapted to the work for which it is intended, even though the order defines and describes it."

Essential Elements

A limitation on this rule was emphasized, however in a recent decision in an action for damages from the use of an automobile anti-freeze solution in which the injured automobile owner had sued the wholesaler of the product. In holding the wholesaler free of any liability the court said in reference to this Uniform Sales Act:

"Under this provision of the statute there are two essential elements, both of which must exist before a buyer can recover from a seller for a breach of an implied warranty: (1) the buyer, either expressly or by implication, must make known to the seller the particular purpose for which the article he is buying is required by him, and (2) the buyer must make it appear that when he purchased the article he relied upon the seller's skill or judgment. The wording of the statute seems clearly to indicate that the transaction or sale must be one between the immediate parties thereto."

Another feature in the Uniform Sales Act, under which the court held the air conditioning dealer responsible for the consequences of the inadequate current, was brought out by the court of a midwestern state a few years ago:

"The factors required," that court pointed out, "were (1) the seller undertaking to furnish for a particular purpose and (2) the buyer relying on the seller's judgment. The term 'particular purpose' means a special purpose as distinguished from the ordinary use of the article in question."

The owner of an upholstery business who had previously operated in his own home, decided to build an addition to his house for use as a display room and workshop. He consulted a dealer regarding the installation of a heating plant, and the dealer assured him that he could install such a plant. Three months after the installation, the owner was convinced the plant would not heat the premises as the dealer had assured him. He then asked the dealer to remove it and give him a refund.

In its decision in the action brought by this owner for the recovery of his money, the court said:

"There was an implied warranty of fitness for a particular purpose in this contract of sale. The owner told the dealer the purpose for which he required the heating equipment, and relied upon his skill and judgment to supply a plant suitable for that purpose. The owner could rescind the contract, offer to return the heating equipment to the dealer and recover the amount paid on the purchase price."

Dealer Liable

Basing its decision on these applications of this statute, the Oklahoma court said in conclusion of its decision that the dealer and not the purchaser was responsible for the lack of electric current:

"In connection with the purchaser's contention that the machine was unfit for the purpose for which he purchased it and that such unfitness was due to the insufficient electric voltage in the building in which the purchaser's office was located, this did not relieve the dealer of liability.

"It was incumbent on the dealer by whom the machine was installed and to whom the place where and the purpose for which the purchaser bought it were known, to ascertain before installing the machine, whether it would properly operate upon an electrical voltage furnished in that building. This the dealer did not do. The purchaser bought the machine in reliance upon the dealer's assurance that it would work properly in his office and keep at least one room cool. Therefore the implied warranty was for a particular purpose and it is clear that the machine failed to function properly."

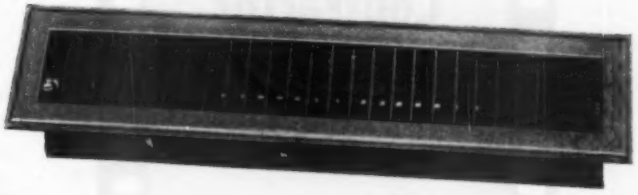
[Note: While this discussion applies to actual cases, it should be remembered that legal rules vary in different states.]

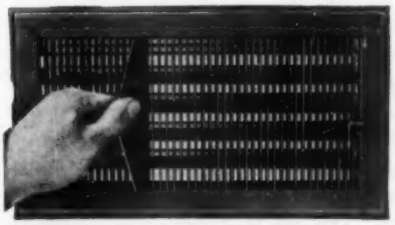
GO AHEAD WITH U. S. FOR 1955

Make it the BIGGEST ever!

No. 1000 BASE DIFFUSER

WINDS UP THE YEAR IN A BLAZE OF GLORY— WITH UNEQUALLED SUCCESS AND ACCEPTANCE! THE FIRST SEASON OF THE NO. 1000 PROVES MORE THAN 50% SAVING IN LABOR.





No. 256

UNEXCELLED AS A MULTIPLE-VALVE SIDE-WALL DIFFUSER

No. 410 GREATEST FLOOR DIFFUSER

Two More Sizes 2¼ x 10 and 2¼ x 12 — New Sector-Wheel operation — increasing in favor an "ALREADY PERFECT LINE" For 1955.

WATCH IN JANUARY FOR THE ANNOUNCEMENT OF THE FINEST LINES U. S. HAS EVER DEVELOPED FOR AIR CONDITIONING!

UNITED STATES REGISTER COMPANY

BATTLE CREEK, MICHIGAN

MINNEAPOLIS • KANSAS CITY • ALBANY

SOLD BY LEADING JOBBERS FROM COAST TO COAST

HORIZONTAL AND VERTICAL expansion and contraction stresses are absorbed by the standing seams and gutter flashing strip respectively

Details of fabrication and installation suitable film presentation for

By Lawrence E. Gichner

THE NEW color movie, *Sheet Metal in Building Construction*, by Revere Copper and Brass, Inc., is slated to win friends for the company. It hits squarely at the installer of copper roofing and copper flashing and shows how installation should be done. The highly educational movie employs color, effective dramatics, and intensely condensed material. The whole approach is practical and no effort is made to avoid the very controversial subject of copper flashing in its application on slag and built-up roofs.

Revere, through the selection of a popular national hero as name and trademark, has sought to humanize itself and its products, and Paul gallops picturesquely in the film.

It opens with a series of camera shots of a variety of copper roofs. The magnificence of patina on various

SOLDERING GUTTER SEAMS in lead-coated copper gutters used on the United Nations assembly building

techniques make a

shop and office training classes

structures is shown with true color rendition and fidelity. Background scenery is subdued, but dramatically selected.

The film deserves to be seen, and on occasion reviewed as a reminder of the principles presented — principles which should be learned, mastered, and most important, applied, if the consumer is to receive the full value from the money he spends for his copper roof. It is a picture not only for the leaders in our industry, but also for foremen, mechanics and apprentices.

The Torture Test

The viewer is shown, in Revere's laboratory, the study made on copper guttering under accelerated weather conditions varying in extremes of heat and cold; what happens to expanding and contracting sheets; how, under certain conditions they will buckle, split and tear; and why it is important, in the light of this knowledge, to use hard copper of appropriate weight to withstand the elements over the years.

The film shows buildings which have been in existence for decades and illustrates how scientists have studied and collected with care the features of roofs which have proven trouble-free and those which have presented problems.

Next in the film sequence is shown how, with the knowledge gained by this research, copper roofs are installed — not on sample, trial, or test buildings, but on actual large commercial and institutional projects.

A question arises as to whether the application of caulking compound on the seams of base flashings and the use of copper base flashings on slag roofs are the best methods for assuring an enduring, trouble-free installation, but the company takes a firm stand in presenting its opinion on the subject. For the present, I believe it is a question on which others should be heard.

This difference of opinion is in no way intended to detract from a truly important, well-done film which I highly recommend for all engaged in the installation of copper or other metals for roofing.

The 46-minute, 16mm film was directed by the company's research and development department. It is the film version of Revere's standard manual, *Copper and Common Sense*, and is also recommended viewing for state sheet metal contractors' associations.

Cut Distributing Costs

. . . by incorporating methods which place the wholesaler in a position to serve the dealer more effectively

HOW TO BETTER SERVE our industry was the theme of the 44th annual meeting of the National Association of Sheet Metal Distributors held in Atlantic City October 4 and 5. Subjects discussed covered the advantages to a wholesaler of maintaining a perpetual inventory system, the importance of adequate product knowledge, building your staff around capable employees, developing executive ability, current economic trends and the future of the steel industry and its relation to the sheet metal distributor. The information given on these subjects by nationally known speakers will aid the sheet metal distributor in operating his business more effectively and at reduced costs which can be passed along to the dealer and the consumer.

As reported in American Artisan for November, new officers elected were Lee J. Haines, president; and Roger K. Becker and Louis F. Demmler, vice presidents. Elected to the executive committee for terms expiring in 1957 were Conner Clapp and John J. Worley, Jr.

Prospects for Business in '55

In his speech, *A Look Ahead at Steel*, Mr. Bennett S. Chapple, Jr., United States Steel Corp., said, "Frankly, I am always somewhat concerned when I am called upon to discuss the business outlook in a meeting such as this. My real concern is not, as you might think, that actual events will prove me wrong, for I am quite willing to accept as part of the game the forecasts that go wrong as the result of an unforeseen and perhaps unforeseeable event such as the Korean War, or even as the result of a failure in human judgment. My real fear is that any forecast I may make will be accepted as gospel by some of my listeners, and as such adopted by them as a basis for action by themselves or by their companies.

"It seems to me that to be truly useful in planning, a forecast should be hammered out in the forge of a company's own organization. It should represent the knowledge, the experience, the mature judgment of competent men in every part of the company's own commercial organization. To these opinions from inside your own organization then may be added the qualified views of outsiders — such as those I am about to give you — but they should not be accepted blindly. Moreover, safeguards should be taken to compensate for possible error.

"I, therefore, hope that in making up your own minds regarding the year ahead, you will review my comments critically; you will use them to stimulate your own thinking; and you will employ them to check your own judgment. In the end, however, I strongly urge that you arrive at your own forecast for planning purposes, a forecast which you will be willing to live by, unless and until fundamental factors change and lead you to a significant revision of that forecast.

"Governmental attitudes, actions and policies have come to be a very important overall factor affecting business conditions in our generation. At the same time, they have become one of the factors least subject to prediction.

"In my opinion, the administration and Congress have made great progress in improving the business climate, and in generating confidence among businessmen. They have succeeded in checking the inflationary spiral by reducing the federal deficit. They have released the strangle hold which the government had on all our businesses through direct controls of various kinds. They have reduced taxes somewhat and, more important, have moved toward a revision of our antiquated tax laws in the direction of greater stimulation of risk taking and business enterprise. All these things are desirable; and, to the extent they are continued and expanded, they contribute to sound and expanding business.

Sees Inventories Stabilized

"Of more than ordinary importance is the level of steel inventories in the hands of steel consumers. What has been happening to such inventories is shown by the fact that there has been a substantially greater decline in steel production during the past 12 months than in manufacturing activity generally.

"Inventory reduction must, however, eventually come to an end. I firmly believe that point has now been reached. Therefore, in 1955, steel usage by steel consumers will be the chief factor determining steel demand.

"Over the years, a substantial proportion of the steel consumed in this country is delivered to consumers through the vast network of jobbers, dealers and dis-

PREFERRED ...

... by Contractor

... by Home Owner

Transite Gas Vent Pipe installs easily, assures long service

Transite Type B Gas Vent Pipe is the only pipe continuously listed by Underwriters' Laboratories, Inc. since 1932, for use as a vent pipe for domestic gas burning appliances. Type B-W Gas Vent Pipe, also UL-listed, vents recessed wall heaters.

WHEN Johns-Manville developed Transite Gas Vent Pipe over twenty-five years ago, the main objective was to produce an efficient, economical gas vent that would meet the requirements of contractor and home owner alike. Success in fulfilling this purpose is best demonstrated by the more than 75,000,000 feet now in use.

Because it is made of asbestos and cement, Transite Gas Vent Pipe offers unusual strength and durability. It can't rust, is highly resistant to corrosion and does not burn. Relatively light in weight, it is easily and quickly assembled . . . fits all standard round and oval outlets of domestic gas burning appliances.

Both round and oval shapes of Transite Gas Vent Pipe permit complete freedom of design. Fittings are available to meet the need of any layout problem.

For further information about Transite Gas Vent Pipe, write to Johns-Manville, Box 60, New York 16, N. Y.

JM PRODUCTS

Johns-Manville TRANSITE GAS VENT PIPE

for venting domestic gas burning appliances

tributors who are the medium by which thousands of steel users requiring small quantities of steel are served. I know you will be particularly interested in the outlook for this distributing segment of the steel industry.

"Consumers' stocks have been reduced to levels which are in line with their own production. Already steel users are turning to warehouses for their spot needs and for their specialty requirements. This trend will continue and strengthen.

"It is my belief that next year will be a period of overall business stability, at approximately the current level. But there should be less uncertainty and more confidence among businessmen than during 1954. Stability at reasonably high levels and success in meeting competitive conditions both tend to create confidence.

"We are now at the point where sound and realistic planning, proper merchandising and aggressive selling can bring their greatest rewards. If we keep our business house in order, and continue to enjoy the benefits of a government dedicated to free enterprise, there is no reason why most businesses should not enjoy business success and profits at current levels, and be ready to take full advantage of the next great upsurge in the growing American economy."

Dealer's Viewpoint on Salesmanship

The Importance of Adequate Product Knowledge was the title of a paper presented by Max Tepper, Champaign, Ill. distributor, who said, "I was a dealer before I became a distributor and today I would like to address you from the dealer's point of view. As a dealer I would place my orders with the man who can talk my language, who will not look confused when I ask for a stack switch and start fumbling through his catalog. Time is mighty important to your salesman — there are all too few hours in his day. It is also important to me. Minutes or hours saved because your men have their information well at hand add up to additional time in my day and dollars in my pocket.

"I would place my orders with the man who can look at a set of blueprints lying on my work table and come up with helpful suggestions of products which will do the job better than those specified, or better work practices, a case of two heads doing a better job than one and with the second head carrying out the business because he is kept posted. I like to discuss my jobs with a well informed salesman. From many people like myself they gather information and it is mostly about merchandising techniques that will help me sell their products.

"I would place my orders with the saleman who keeps me posted on the new merchandise as it presents itself to the market. I read trade magazines and I go to trade shows. Not all manufacturers advertise in all the trade journals, and only a few display at conventions, and it is easy to miss some that are there.

"I would place my orders with the salesman who knows what is in his warehouse. There are few things that will make a contractor see a brighter shade of red than to order merchandise for a job and have the shipment come in short a key piece. Even if you handle a large annual volume, it is possible with a set of arrival lists and sort sheets to keep your customer posted on delivery and erection progress. It is imperative that your salesman be familiar with his stock and his merchandise so that he can bridge the gap of a shortage with a substitution before the shortages appear. The man who can do that is the man for whom I will save my orders.

"It is not possible for any one man to know everything about all the lines he has to sell. There are toughies that show themselves from time to time. Usually they are nickel or dime items but they are just as important to my customer and myself as are the nice big juicy orders. These nuisance orders are the gateway to more and more business. The salesman who sloughs them off in my store, who will not take time to come up with the answers, also sloughs off the orders he would like to have. Knowing where and how to find this information is another form of product knowledge.

Information for the Sales Force

"I have told you what I expect of your salesman. How you transmit information to the people who represent you is another problem, best solved by the individual from his own experience. But, as a distributor, let me tell you the type of information our sales people start out with every morning: an arrival sheet showing all the merchandise that came into our warehouse the day before; a shortage sheet showing all items which were back-ordered or cancelled out the day before; a look at every piece of literature pertaining to merchandise new or old; a look at all trade magazines; a five minute run down of the happenings in the industry — Joe Doe's shipment is slow coming — it looks like XYZ Company is due for a strike — price adjustments — market tendencies — everything pertaining to our company and its merchandise.

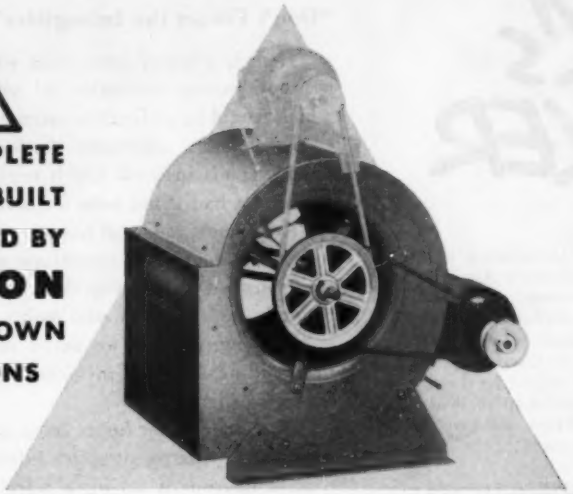
"I would guess that most of us have a bit of conceit, and that we feel we could do a better job than our salesmen. Perhaps we are right, but you equip your men with the information you have, the product knowledge you so proudly hold and you may find that you are no longer the top sales producer in your organization, but you will also be mighty happy with your overall company sales accomplishments."

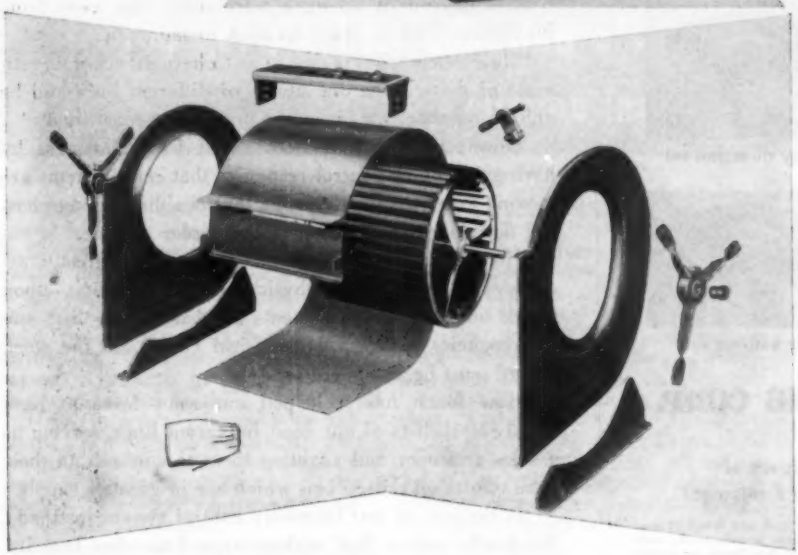
The quantity of merchandise to keep on hand is always a serious problem for the wholesaler, and the best system of inventory control is at best a very flexible measure. Louis F. Demmler, Pittsburgh distributor, in describing the perpetual inventory system used by his company, said, "Our receiving department has always been under orders to count everything that comes in. However, when the boys got rushed, it was easy to take

TWO WAYS *to get the Best Blowers that MONEY CAN BUY!*

1

BUY THE COMPLETE BLOWERS . . . BUILT AND ASSEMBLED BY MORRISON . . . TO YOUR OWN SPECIFICATIONS





2

Buy Morrison parts and assemble them in your own plant. With sufficient man-hours of down time and with your present man power you can save up to 50% of your invested blower dollars. Less storage space is required — and no additional overhead.

Many companies assembling their own blowers find this system more flexible and more adjustable to their overall manufacturing operation. Quality is controlled in every step of the assembly.

Either way, you get the best blowers that money can buy . . . the choice of leading original equipment manufacturers.

MORRISON PRODUCTS, INC.
16816 WATERLOO ROAD • CLEVELAND, OHIO

CONNOR
ENGINEERING CORPORATION
kno·draft®
adjustable air diffusers

Get your JOB OK's QUICKER

Contractors everywhere report faster installation and faster job O.K.'s with Kno-Draft Adjustable Air Diffusers. Mechanical simplicity is the answer. *And* Kno-Draft Diffusers are adjustable *after* installation.

To install Kno-Draft, simply attach outer cone to duct and fasten preassembled diffuser unit to three suspension bolts. A few twists of a screwdriver adjust air direction to any discharge angle from horizontal to vertical. Single annular air stream permits direct volumetric reading. Damper is regulated by hand screw.

1 Easy Installation

2 Easy direction set

3 Easy balancing

4 Easy volume set

CONNOR ENGINEERING CORP.
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Dept. S-124, Danbury, Conn.

Please send me the *new edition* of the Kno-Draft Data Book —without obligation, of course.

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the manufacturer's packing list or the trucker's dray slip and use that as the basis for the receiving report. Now everything is counted because if there is a variation between stock control and actual inventory, someone wants to know why and someone else had better come up with the right answer. I don't know how much merchandise we used to pay for but never received because of shipping errors and haulers' losses. It must have been considerable, judging from the discrepancies we have discovered since we started counting everything.

"Don't Forget the Intangibles"

"Here is a list of intangibles which you will recognize as representing a number of sales, the total value of which would be difficult to estimate:

"How many customers' orders have we saved by having goods in stock which might have been permitted to run out had it not been for inventory control?

"How much good will have we developed by being able to give customers the immediate answer as to what is in stock instead of making them wait until someone runs through the warehouse and makes a physical count?

"How much have we saved in costly duplication of order filling, hauling, invoicing and bookkeeping caused by back orders?

"How many man hours have we saved by letting the purchasing department get its information from inventory control instead of taking a warehouse man away from his regular work to make up stock memoranda?

"How much has it meant to us to have an accurate estimate of the seasonal variations of different lines and be able to regulate our inventory investment accordingly?

"How often have we been saved from shortages by having inventory control recognize that certain items are moving faster than anticipated, thus enabling the purchasing department to send a covering order in time?

"How much have we gained through the greater accuracy of our annual physical inventory-taking, upon which our financial statements are based, now that any discrepancies between the physical count and the stock record must be accounted for?

"How much has it helped our sales force to have weekly stock lists of our most important lines, serving as a sales reminder and enabling them to concentrate their sales efforts on those items which are in greatest supply?

"Is the cost of our inventory control system justified? We firmly believe that, without regard to other benefits, our inventory control system more than pays for itself."

Locating and Employing Capable People

The right kind of people are the key to a company's success, according to Robert W. Mason, Toronto wholesaler, who said, "Some distributing companies consider *sales* the most important function, others that *purchasing* or *material handling* or *the lines handled*, add most to success. Actually, all of these have a part to play if our

WHY IT PAYS TO BUY GALVANIZED SHEETS FROM US

• USS Galvanized Steel Sheets are noted for their unusually tight protective coating of zinc that effectively resists cracking and flaking under tough fabricating operations—bending, rolling, cutting, stamping, soldering. This means a faster, better fabricating job. And these sheets are consistently uniform in ductility, flatness and surface finish.

USS Galvanized Sheets – as well as *all* the steel sheets and strip that we sell—are the well-known, always reliable products of United States Steel . . . the world's foremost manufacturer of fine steels.

Whatever your requirements for sheets or strip, of any type, it will pay to call U.S. Steel Supply. You will get fast delivery of exactly what you need from our complete stocks. In addition, we are staffed to give qualified technical asistance in helping you solve difficult application problems. And, for cutting or shearing your sheets to size, our modern equipment means closer tolerances, less scrap loss.

In addition to USS Galvanized Steel Sheets, call us for: hot rolled, cold rolled, Vitrenamel, galvannealed, paint bond, corrugated, and long terne sheets, and hot rolled and cold rolled strip.

TRIPLE SECURITY

What you want
When you want it
At the right price

U. S. STEEL SUPPLY

DIVISION

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Warehouses and Sales Offices
Coast to Coast

USS STEEL — UNITED STATES STEEL

UNITED STATES STEEL

EXCLUSIVE
FOUR-POINT
SPRING
MOUNTING!
No customer complaints about noise when you install a Chelsea! 4-point spring mounting cuts vibration. Insures permanently quiet operation.
Adapts to Either Vertical or Horizontal Installation
Only 1 type to stock when you sell Chelsea HV attic fans! Accessory kits* allow installation of same fan in horizontal or vertical position.
*Includes canvas boot and spring set.
Complete Range of Sizes
Chelsea offers 21 models in fan diameters from 24" to 60". Complete package units for easy installation.
Full 5 Year Guarantee
An important sales feature! Helps to protect both contractor and customer.
CHELSEA
ATTIC FANS
CHELSEA
CHELSEA FAN & BLOWER CO., INC.
PLAINFIELD • NEW JERSEY

business is to be successful. But does anyone ever say the success of business depends on the selection of personnel?

"Let's consider what has been going on for years in the personnel selection department. Most companies hired their people as the boss thought they were required. The boss usually did the hiring — in some cases getting opinions from the head of the department where the new employee was to work.

"In more recent years, the approach has been slightly more scientific: questionnaires prepared for the employment seeker to fill out; interviews to draw out the prospect; some vague sort of standards with give and take features — a sort of 'add up the score — if it is 65 or more, you are in.'

"A great deal of knowledge in the field of personnel selection came about on account of World War II. The armed forces made an effort to fit the round pegs into round holes. They used aptitude tests extensively, interviews with psychologists, reports by training officers, conferences, etc. They had some success.

"Businesses, generally, have become conscious of the need for better methods of personnel selection. Most of us are pretty close to our sales departments. Here especially, it is important to select the right men. Sales ability is a most difficult thing to define, to analyze, to assess. We can all use help in picking the right man.

"The question is, how can we improve our batting average in this game of picking good men? You may read books on the subject. You may resort to questionnaires and aptitude tests. You may have the applicant interviewed by two or more people who later compare notes to decide his fate. Or — and this is the new way — you may place your order with one of the clinics, usually known as business consultants, who specialize in personnel selection.

"These consultants are not new to any of us. If we haven't used them, we have at least heard or read about them. They are professional pickers of round pegs for round holes, or square pegs for square holes. These clinics will test an applicant for you and give you a full report on his aptitude, attitudes, abilities, etc. They will investigate his past and make recommendations to fit him into your organization.

"The agencies will also test individuals who come to them for vocational guidance — and for placement in a business for which they are suited. If you have an order with them they may come across a suitable man from among those seeking self analysis.

"At first their fee seems high for the services rendered. There is, however, a great deal of merit in the use of business consultants. Their fees will not be high if their batting average in selecting good employees is better than ours. For instance — have you figured the cost of hiring a salesman lately? Well, if you have, you know that they are expensive. But first costs aren't quite always the most important in the long run. Select your staff the same way you would any other business asset."

NEW CHEVROLET TRUCKS

keep going longer, keep going for less!

From the day you first put it on the job until the time comes to trade, your Chevrolet truck's going to do more work for you while you spend less to keep it going. Here's why you can count on it—

INCREASED POWER SAVES YOU PLENTY

Chevrolet's high compression ratio (in each of its three great engines) develops more power. That means you go longer before filling the tank! It means, too, you've got extra power handy whenever you need it—for greater acceleration, for an easier pull up steep grades, for steadier going through mud and sand on off-the-road jobs. So, you save not only on operating costs—you save *time* as well.

GREATER RUGGEDNESS PAYS OFF IN LONGER LIFE

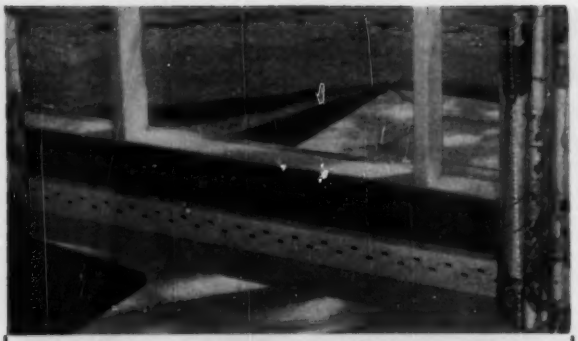
Two-ton models, for example, are equipped with heavier axle shafts. All models have newly designed clutches and stronger frames. The best part of it is that, throughout their longer life, you spend less for their upkeep. For complete details about the model you need, see your Chevrolet dealer. He'll tell you whatever you want to know, then give you the best news of all: Chevrolet trucks are priced lower than all other lines! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

MOST TRUSTWORTHY TRUCKS ON ANY JOB! CHEVROLET

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

THREE GREAT ENGINES—The new "Jobmaster 261" engine* for extra heavy hauling. The "Thriftmaster 235" or "Loadmaster 235" for light-, medium- and heavy-duty hauling. **NEW TRUCK HYDRA-MATIC TRANSMISSION***—offered on ½-, ¾- and 1-ton models. Heavy-Duty **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **DIAPHRAGM SPRING CLUTCH**—improved-action engagement. **HYPOID REAR AXLE**—for longer life on all models. **TORQUE-ACTION BRAKES**—on all wheels on light- and medium-duty models. **TWIN-ACTION REAR WHEEL BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—greater holding ability on heavy-duty models. **NEW RIDE CONTROL SEAT***—eliminates back-rubbing. **NEW, LARGER UNIT-DESIGNED PICKUP AND PLATFORM STAKE BODIES**—give increased load space. **COMFORTMASTER CAB**—offers greater comfort, convenience and safety. **PANORAMIC WINDSHIELD**—for increased driver vision. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—easier, safer handling. **ADVANCE-DESIGN STYLING**—rugged, handsome appearance.

**Optional at extra cost. Ride Control Seat is available on all cabs of 1½- and 2-ton models, standard cabs only in other models. "Jobmaster 261" engine available on 2-ton models, truck Hydra-Matic transmission on ½-, ¾- and 1-ton models.*



PATCO AIR BASEBOARD
MORE THAN SATISFIES...

the contractor

"I'm installing Patco Air Baseboard," says Dan Doskow, third generation heating contractor, "because it's much easier and faster to install. I can do more jobs with Patco and my customers like it better, too."
Charles S. Apgar says, "Patco caused me to start in the warm air heating field. The decision was made easy when I found I did not have to invest in expensive metal working equipment and I could readily adapt my men to this simple installation."

the jobber

Bethlehem, Pa., plumbing and heating jobber Carl M. Adams says, "Experience shows that Patco has proven itself a superior product. It has many advantages of design, humidification, air filtration and air circulation. Disadvantages of conventional warm air systems are eliminated. We expect to double our volume during the next year with Patco systems."

the builder

Carl Metz, builder of fine homes, says: "I put Patco Air Baseboard in my developments because it's the perfect diffuser for warm and cool air and is economical to install. It has many other features which help sell my homes — pleasing appearance, no drafts, noiseless operation and it eliminates smudges and streaks on walls."

the home owner

From Richard L. Ferris, Maryland: "The inclusion of your heating system in our new home has proven to be a most satisfying step. This type is outstanding in that it takes up little room, blends well with the room setting and provides an even, well-distributed heat throughout."
From Anne Eckert: "Being sixty-eight years of age, I appreciate the nice warm air that uniformly blankets the floor and eliminates drafts. The baseboard is very attractive and is no bother to clean, as it does not streak or produce dust."
You'll be more than satisfied, too. Get details today.

PATCO MFG. CO.

PATCO AIR BASEBOARD
THE WALL RADIATES HEAT

231 N. 3rd St. Philadelphia 6, Pa.

WHAT ASSOCIATIONS ARE DOING —

(*Continued from page* 50)

Indiana Names Convention Committees

HAROLD BOYD, chairman of the convention committee of the Sheet Metal and Warm Air Heating Contractors' Association of Indiana, with the assistance of Charlie Buck and Homer Selch, has set up a number of subcommittees to handle details of the association's 37th annual convention scheduled to be held February 3 to 4, 1955 at Hotel Severin, Indianapolis. Appointed to head the various committees are: Russell Harris, program; Homer Selch, hotel; T. B. Speaker, short course; Leonard Hull, banquet and luncheon; Marvin Brezette, entertainment; Oscar Mutz, publicity; and Z. V. Hazelton, reception.

The association reports that its third quarterly district meeting, held at the new offices of the Richmond Supply Co., was attended by approximately 150 contractors and suppliers. Feature of the meeting was an air conditioning panel, which included Howard Sheafer, York Corp.; Walter M. Enoch, Minneapolis-Honeywell Regulator Co.; and Gil Denges, vice president, Williamson Heater Co.

Rochester, N. Y. Group Discusses Safety

HOW TO SAVE MONEY By Being Careful was the subject of a talk given by representatives of Laverack and Haines (compensation insurance) at a recent meeting of the Master Sheet Metal, Furnace and Roofers' Association. The meeting was attended by foremen and key personnel as well as contractor members. Additional safety meetings were scheduled to be held at later dates for contractors' employees not in attendance.

Membership Card Proves Value

THE ROOFING and Sheet Metal Contractors' Association of Georgia, which recently issued membership cards for distribution among its members' key personnel, reports an incident which proves the value of carrying such identification. The representative of an Augusta member, whose business took him to an area designated as restricted following a visit from hurricane *Hazel*, found that it was necessary to have a pass to operate in the area. Upon presenting his card certifying that he was an employee of a member of the Georgia association, he was immediately issued an unlimited pass by the National Guard on duty which was, of course, of considerable help to him in transacting his business with the least possible loss of time.

Beaver Valley Sponsors Convention

SPONSOR OF THE 1955 convention of the Sheet Metal, Air Conditioning and Roofing Contractors' Association of Pennsylvania, scheduled for March 25 to 26 at Beaver Falls, is the Beaver Valley Sheet Metal Contractors' Association. Chairman of the convention committee is Joseph Stark of the Stark Heating Co.

1. Changes under way. Workmen begin demolition of cupola atop the Old Post Office Building in Halifax, N. S. The entire slate roof is scheduled to be replaced by an all-Monel standing seam batten roof.

2. As work progresses, the roof takes on a more modern look. Among the considerations governing choice of Monel, was the well-known resistance of this rugged nickel-copper alloy to salt air.

Could you handle a Monel Roofing job like this one?

3. Finishing touches. Neat and perfectly water-tight seams in Monel present no problems. It is as easy for roofers and sheet metal contractors to do a workmanlike job in Monel as in any other kind of sheet.

In 1950, time ran out for the slate roof of the Old Post Office Building in Halifax, Nova Scotia.

So off came the slate — on went a fine new roof of Monel®.

The job was handled for the Dominion Department of Public Works by D. A. Cummings, Ltd. of Halifax. It is typical of the many profitable Monel installation contracts being let everywhere today.

The reason? Simply that more and more architects are writing "Monel Roofing Sheet" into their specifications. So more awards are being made to contractors who can work with this quality roofing sheet.

Even if you've never done work in Monel, don't let that stop you from going after it right now. *Good workmanship in Monel is little different from what it is in any roofing metal.*

Thanks to its soft temper, Monel Roofing Sheet is readily cut and formed. Because of its high ductility, you can make sharp bends in Monel sheet without cracking it.

For soldering, you pre-tin the sheet in the shop, a good idea with any sheet metal. And use a heavy, hot iron for the actual installation. That way, you wind up with a water-proof — and really neat — soldering job.

There's more about this in our bulletin *Instructions for the Soft Soldering of Monel Roofing Sheet.* Why not write for a copy? And get our 24-page illustrated booklet *One Metal Roof,* too. Then you'll be prepared to quote on the many jobs that are waiting to be done.

Write now. There's no telling how soon you may be asked to bid on some of this profitable business.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

Monel Roofing INCO TRADE MARK **Nickel Alloys**

. . ."for the life of the building"

equipment developments (From page 54)

from 65,000 to 300,000 Btu input for natural and mixed gas; 65,000 to 250,000 for manufactured gas and 65,000 to 150,000 for LP gas. Venturi tube is available in lengths up to 20 in. Burners are available with or without controls.

Enclosed Truck Bodies

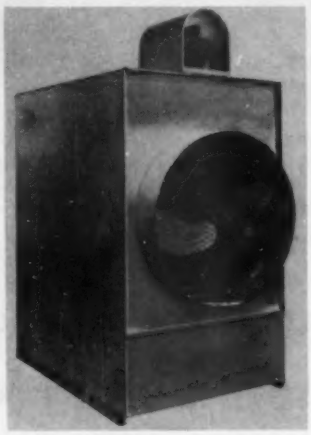
REDESIGNED "ROUTEMASTER" bodies designed for mounting on all standard forward control truck chassis — Herman Body Co., 4400 Clayton Ave., St. Louis 10. Available in steel or aluminum, the line is in three basic sizes with 8, 10, and 12 ft interior load space length. Inside width is 78 in., height is 70 in. All bodies have sliding side doors and utility shelves. The 8 ft body with approximately 300 cu ft capacity mounts on a ¾ ton chassis; 10 ft body with about 375 cu ft capacity fits ¾, 1, or 1½ ton chassis; the 450 cu ft 12 ft body mounts on 1, 1½, or 2 ton chassis.

Packaged Duct Systems

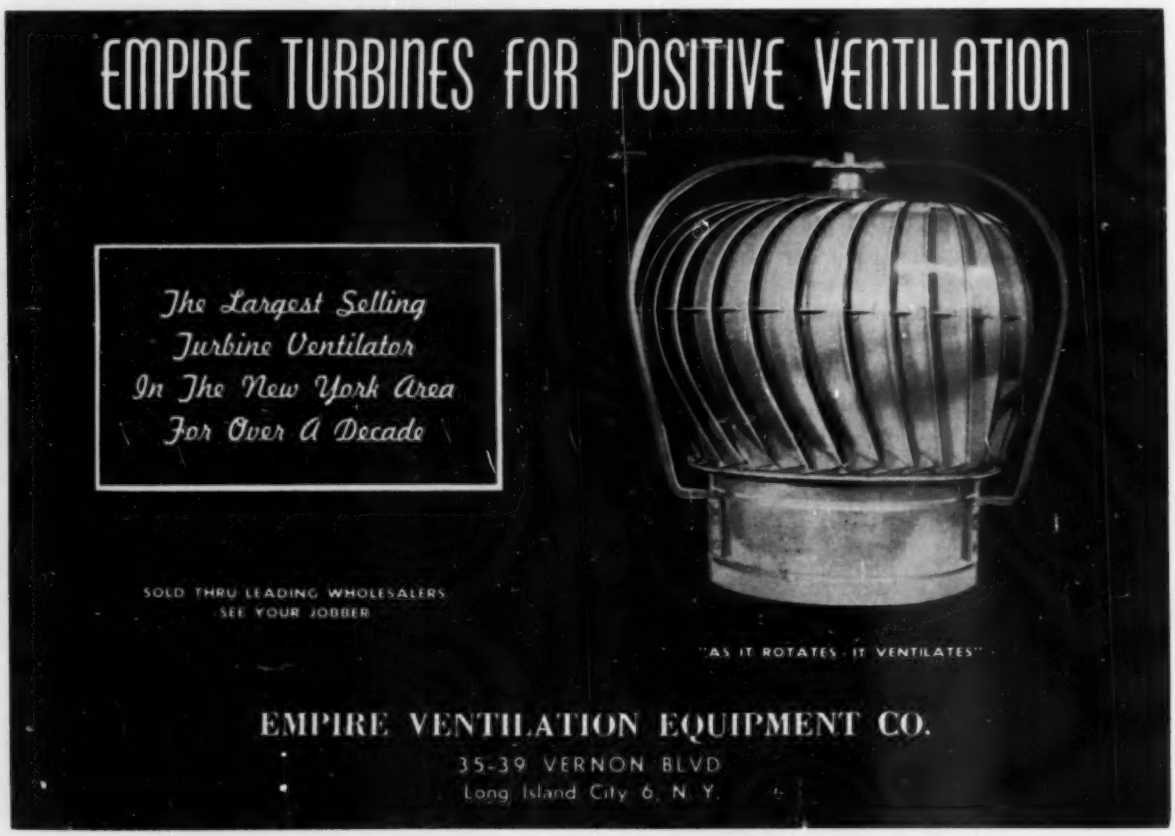
"JENKINS PRE PAK" complete packaged perimeter duct system for a six room house includes registers, return air fittings and plenum chambers — Ralph Mfg. Co., P.O. Box 188, Wadsworth, O. Extra individual run packages are available for larger jobs. Available in four different perimeter units with floor or sidewall diffusers, the package includes duct and connectors.

Water Cooling Towers

"NI" SERIES of mechanical draft cooling towers for residential applications — Niagara Products Co., 4311 E. Thomas Rd., Phoenix, Ariz. The series is available in 3, 5, 7½ and 10 ton capacities. Internal construc-

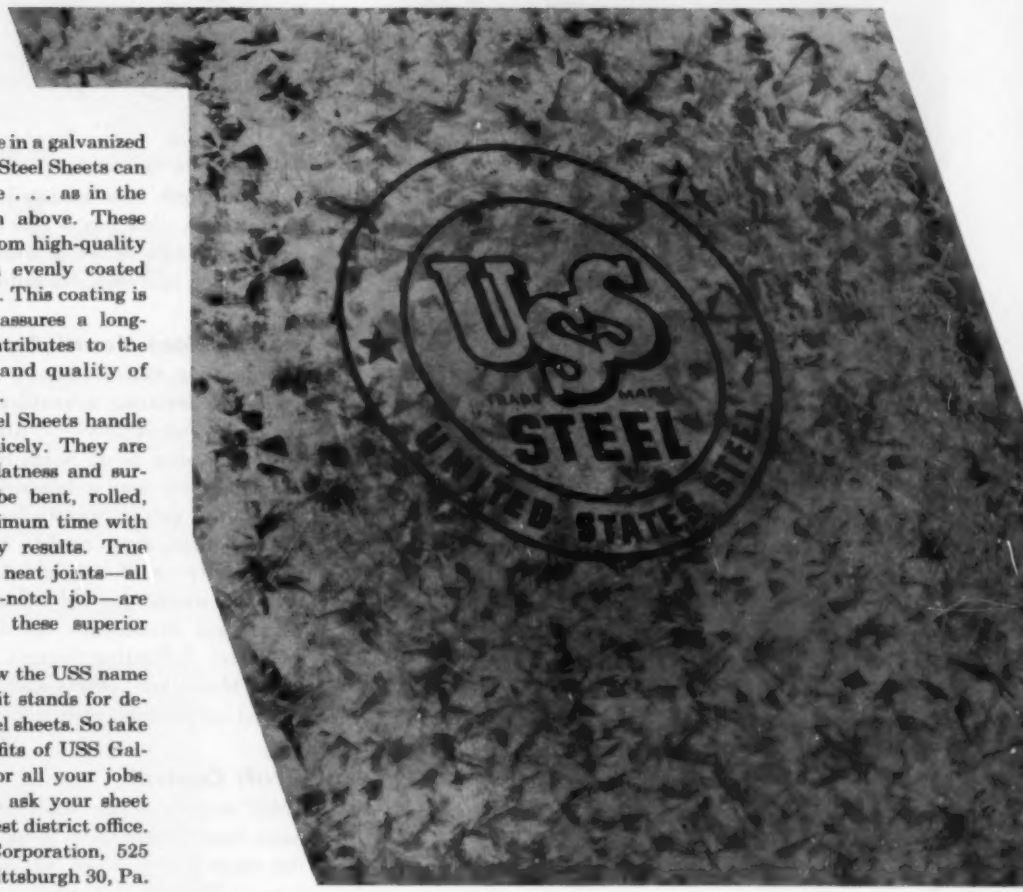


tion includes fungus treated redwood deck and noise reducing sound absorbent material. Cabinet is fabricated from 14 gage galvanized steel with weather


EMPIRE TURBINES FOR POSITIVE VENTILATION
The Largest Selling
Turbine Ventilator
In The New York Area
For Over A Decade
SOLD THRU LEADING WHOLESALERS
SEE YOUR JOBBER
"AS IT ROTATES - IT VENTILATES"
EMPIRE VENTILATION EQUIPMENT CO.
35-39 VERNON BLVD
Long Island City 6, N. Y.

USS Galvanized Steel Sheets

assure corrosion resistance



For corrosion resistance in a galvanized sheet, USS Galvanized Steel Sheets can be used with assurance . . . as in the roof ventilators shown above. These fine sheets are rolled from high-quality carbon steel and then evenly coated with rust-resistant zinc. This coating is tightly adherent and assures a long-lasting finish that contributes to the pleasing appearance and quality of every job you turn out.

USS Galvanized Steel Sheets handle easily, and work up nicely. They are uniform in ductility, flatness and surface finish; and can be bent, rolled, stamped or cut in minimum time with completely satisfactory results. True bends, tight seams and neat joints—all characteristic of a top-notch job—are quick and easy with these superior sheets.

Your customers know the USS name—they recognize that it stands for dependable quality in steel sheets. So take advantage of the benefits of USS Galvanized Steel Sheets for all your jobs. For more information, ask your sheet distributor or our nearest district office. United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS GALVANIZED STEEL SHEETS

4-1897

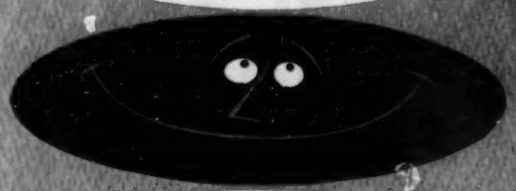
USS

UNITED STATES STEEL

NO BLASTS

NO COLD CORNERS

NO HOT SPOTS

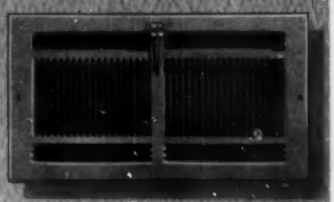


...just pure comfort!

WITH STANDARD'S NO. 551 PERIMETER WALL REGISTERS

Air is diffused 4-ways, along the outer cold walls, providing complete 360° hemispheric heating or cooling.
New fractionator volume control,
standard screw holes,
single shutter control, smart appearance,
for sidewall or baseboard installation.
See for yourself why Standard's 551 is the best perimeter wall register on the market!

MAIL THE COUPON FOR FREE LITERATURE.



STANDARD STAMPING & PERFORATING COMPANY
3137 WEST 49TH PLACE, CHICAGO 32, ILLINOIS AA-12

Gentlemen: Please send me literature on the Standard No. 551 Perimeter Wall Register.

NAME_____
COMPANY_____
ADDRESS_____
CITY_____ ZONE____ STATE_____

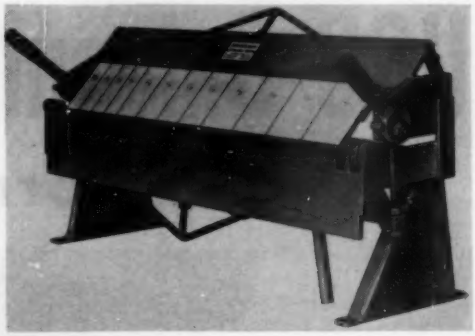
Standard

equipment developments (Continued)

shielded motor hood mounted on top. Dimensions vary from 55 in. deep × 24¾ in. wide × 62½ in. high in the three ton model to 55 in. deep × 36¾ in. wide × 74 in. deep in the 10 ton model.

Universal Bench Brake

MODEL U322 universal bench brake designed for accurate short run production, experimental work and plain or box and pan jobs which would tie up larger, more expensive equipment — W. Whitney Stueck Inc.,



Old Saybrook, Conn. Rated capacity of the portable machine is a ⅜ in. flange on 22 gage mild steel, in full 3 ft length. Case hardened steel fingers in 2, 3 and 4 in. widths allow box depths to 3 in. Design features include replaceable bronze bushings, easy adjustments and simple operation, according to the company.

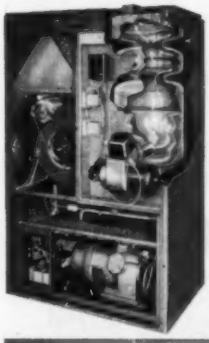
Power Roof Ventilators

POWER ROOF EXHAUSTERS for factory and warehouse buildings, featuring a ventilated motor compartment for easy accessibility — Airoflo Engineering Co., 3777 Cahuenga Blvd., North Hollywood, Calif. Standard model FC uses a forward curved blade blower; model N-O uses a non-overloading backward curved blade blower. Both models have hinged hood and hasp, safety cutoff switch, rubber vibration eliminators and weatherproofed framework housing. Blower wheels are dynamically balanced, according to the company. Self-acting louvers with aluminum, felt-edged blades and louvers operated by electric damper control are available at extra cost.

Draft Control

"MG" DOUBLE ACTING draft control for gas-fired furnaces now manufactured in an 8 in. size to provide a size range now of 8, 10, 12, 16, 20 and 24 in.—Field Control Div., H. D. Conkey & Co., Drawer 11, Mendota, Ill. The 8 in. gate is 20 gage steel with a 12 gage ring and 18 gage side plates; the 24 in. model has a ¼ in. × 2 in. steel ring, 14 gage gate and 16 gage side plates. The series is a double acting control with

It's here! The smallest year-round home air conditioner on the market!



WHISPER-QUIET OPERATION. Smooth-running compressor is hermetically sealed and shock-mounted. Vibration-free blower is permanently lubricated and dynamically balanced. Ceramic-coated heat exchanger muffles burner noise.

ONE-POINT THERMOSTATIC CONTROL. Home-owners can change from summer cooling to winter heating by flicking a switch and setting temperature wanted. No fiddling with dampers.

That's right! The brand-new, 1954 Worthington year-round air conditioner takes up less space than any other unit of the same capacity. It measures only 29″ deep x 42″ wide x 70″ high, goes through a 30″ door.

It's a completely modern forced-air heating and cooling unit; so good looking it can be installed in a playroom; so compact it can fit into a closet. We designed this unit for easy installation in any type of home.

Home-owners have their choice of gas- or oil-fired heating. Either way, they get economical, balanced heat. And the hermetically sealed cooling unit has a five-year warranty.

Take a long look at some of its "years ahead" features shown in the photos. Then see your nearest Worthington distributor for more facts and figures. Ask for our new folder, "What Every Builder Should Know", C-1100-B54, or write Worthington Corporation, Air Conditioning and Refrigeration Division, Harrison, N.J. A-4.58

WORTHINGTON

Climate Engineers to Industry, Business and the Home

equipment developments *(Continued)*

the gate opening inward to relieve down drafts. Optional safety switch which closes the main gas valve in the event of a prolonged down draft is available.

Service Truck Bodies

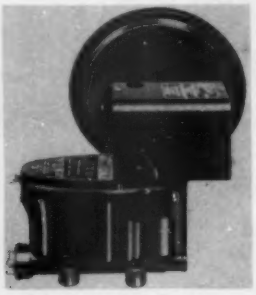
LINE OF SERVICE truck bodies to fit 40 different Chevrolet, Ford, Dodge, Studebaker, GMC and International chassis — Morrison Steel Products Inc., 601 Amherst St., Buffalo 7, N. Y. Bolstering the line are 25 features including bonderized, all-steel welded construction with double lap joints, 18 compartment

arrangements, lockable waterproof compartments, 25 to 35 ft loading area, safety tread and non-skid floor, hinged fender panels and assortment of service accessories to tailor trucks to specific use.

Supply Duct Air Filter

"DUSTRAP" air filter, installed in register or furnace supply duct to filter dust from the air before it enters the room—John Shrager, Inc., 2 W. 46th St., New York 36. Dust is filtered from the heated air by a solution impregnated in the washable mesh. After several washings, the mesh can be recoated with a "DusTrap" filter renewer. Filters are available in all round duct sizes.

Above: Air Filter



Above: Flow Valve

Pressurized Burner Fan Control

"AIR PROVER" safety mechanisms designed to provide safety fan control for pressurized burners — A-P Controls Corp., Dept. B, 2450 N. 32nd St., Milwaukee 45. Used with A-P constant level oil control valves, the devices prevent excess oil flow in the event of air

* FIRST LINE

Extended-Surface

HEAT EXCHANGERS

ASK THE

AEROFIN MAN

Specify Aerofin and you specify high efficiency, long service life and low maintenance and service costs.

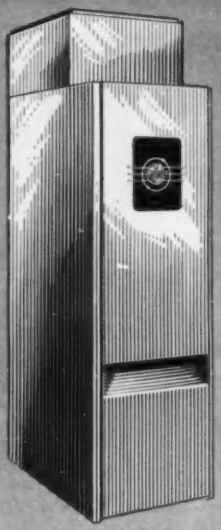
Take advantage of Aerofin's unequalled experience, production facilities, and materials-testing and design research – of Aerofin's complete engineering service at the plant and in the field.

* *Aerofin makes extended heat surface exclusively — not as a by-product, not as a side-line. Sold only by manufacturers of fan-system apparatus. List on request.*

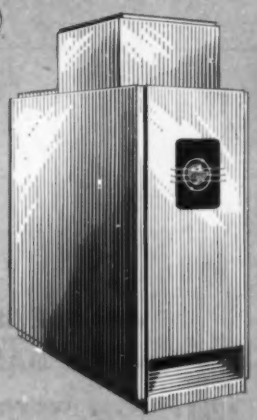
AEROFIN CORPORATION

101 Greenway Ave., Syracuse 1, N. Y.

There's money in the air...
when you sell **CHRYSLER AIRTEMP!**



Guaranteed by Good Housekeeping



Chrysler Airtemp Hi-Boy Space Saver (above) and Lo-Boy Space Saver (below) with inverted "V" cooling coil.

want twice the profit?

THE RIGHT HEATING AND COOLING'S YOUR ANSWER!

Chrysler Airtemp heating and cooling units are "made for each other." Not only do they give your customers perfectly balanced Year 'Round Air Conditioning, but they simplify your job of installation. You will find, too, that widespread preference makes Chrysler Airtemp cooling easier to sell—for installation with the furnace or at any later date. Either way, it's "twice the profit" for you!

This ready-made opportunity to sell heating plus cooling is only one of many plus features you will find ready to work for you in the Chrysler Airtemp Franchise. Write today for complete details.
Airtemp Division, Chrysler Corporation, Dayton 1, Ohio.

Air Conditioning's other name... *Chrysler Airtemp*

CHRYSLER
AIRTEMP
DIVISION OF CHRYSLER

HEATING • AIR CONDITIONING FOR HOMES, BUSINESS AND INDUSTRY

equipment developments *(Continued)*

failure. Model 113A is completely mechanical and is actuated by air pressure against a diaphragm which moves a lever arm to allow full oil flow. Oil flow can then be controlled manually or thermostatically. Model 114B is actuated by a thermally responsive bimetal element which automatically reduces oil flow to a predetermined rate and keeps a safety check on air flow. This model is available with continuous or intermittent combustion fan operation.

Welding Rod

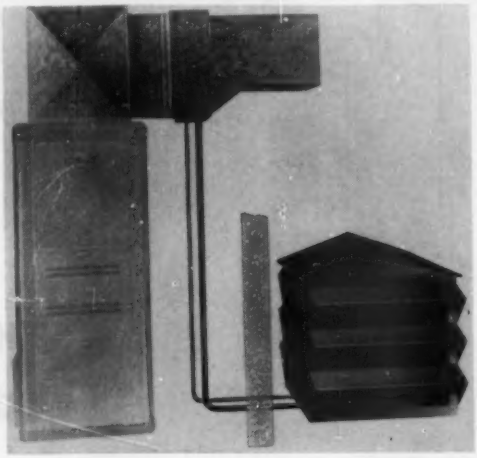
WELDING ROD for industrial work where aluminum and galvanized sheets are used — Miracle Rod Co. of Illinois, 612 N. Michigan Ave., Chicago 11. Packaged 35 to a cylinder, the welding rod is designed for both on-the-job and shop usage.

Halide Leak Detector

LEAK DETECTOR for locating non-combustible halide refrigerant gas leaks — Otto Bernz Co., Inc., 28 Lyell Ave., Rochester 6, N. Y. Gas leaks react with a flame-heated copper plate in the detector's chimney, changing color and intensity in the flame. The chimney is connected by a brass burner and tube to a disposable steel cylinder of propane gas. The rubber search hose is attached to the burner unit by a flexible metal hose connection. Self-sealing fuel cylinder has a neoprene washer and a safety relief valve; burner unit can be removed without fuel leakage. Lightweight and portable, the detector is said to light instantly without pumping or priming.

Remote Condensing Unit and Coil

AIR COOLED CONDENSING UNIT for outside location — The Williamson Heater Co., 3500 Madison Rd., Cincinnati 9. Designed for areas where the use of water cooled air conditioning equipment is limited, the con-



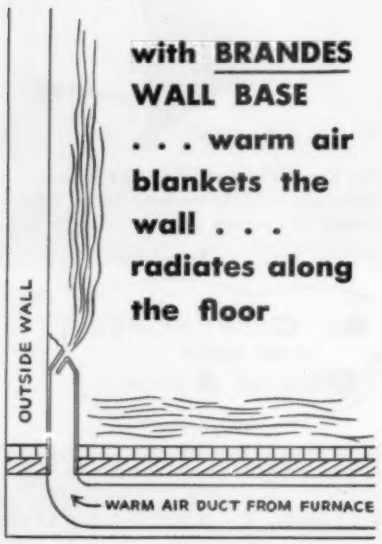
BRANDES
LEADS!
OTHERS FOLLOW

Brandes was the first to initiate wall base heating . . . many others have imitated . . . but for Brandes the experiments are over . . . our wall base heating is time tested, easy to install and low in cost. Write the Brandes Company, 2046 Winnebago Street, Madison 4, Wis. You'll never regret it!

BRANDES LOW COST

PATENTED

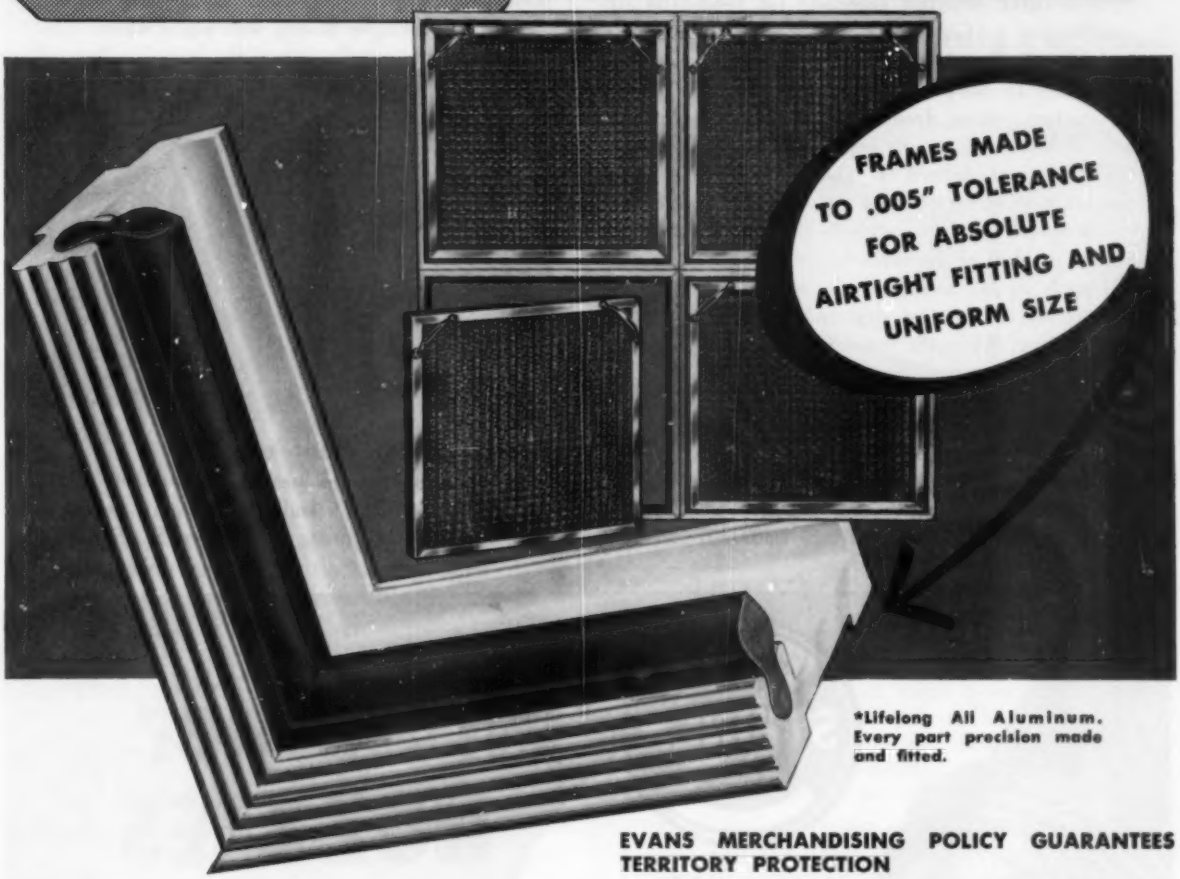
WALL BASE HEATING



with BRANDES WALL BASE . . . warm air blankets the wall . . . radiates along the floor

NEW . . . INDUSTRIAL

Evans Filters & Frames



*Lifelong All Aluminum. Every part precision made and fitted.

EXTRA RIGIDITY HOLDS TRUE DIMENSION AND ALIGNMENT UNDER HEAVIEST STRESS

Made of high strength aluminum alloy. Extruded for superior strength, and highest dimensional accuracy. Filter and frame unit is light. Can be carried anywhere. Easily handled. Weight (including filter, frame, handles, gasket) 16 lbs. 4 oz.

MOLDED NEOPRENE GASKET STOPS AIR AND DUST BY-PASS

Precision manufactured interlocking construction prevents air leakage. Provides proper cushioning for positive sealing. Allows easy removal of filter without releasing dust to air stream.

AS SIMPLE TO PUT TOGETHER AS AN ERECTOR SET

No complicated parts. No complicated instructions. Cuts assembly time to one-half that of conventional type frames.

EVANS MERCHANDISING POLICY GUARANTEES TERRITORY PROTECTION

Adds profits, sales, gives new greater customer satisfaction.

Investigate Now!

MAIL THIS COUPON TODAY!

The George Evans Corp. **Moline, Illinois**

GENTLEMEN: Please send me: ☐ **Descriptive Literature**

☐ **Merchandising Policy** ☐ **Price Lists**

I WANT TO LEARN HOW TO MAKE MORE MONEY OUT OF THE FILTER BUSINESS.

Name ..... **Company** .....

Address .....

City ..... **State** .....

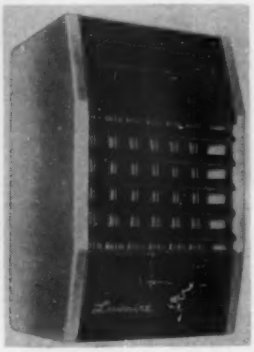
densing unit and duct coils are installed separately and connected on the job by the refrigeration mechanic. Units are available in two, three and five ton capacities with a five year guarantee.

Step Starter for Air Conditioners

STEP STARTER designed especially for residential air conditioners — General Purpose Control Dept., General Electric Co., 1 River Rd., Schenectady 5, N. Y. According to company engineers, the starter breaks the starting voltage drop into two steps, reducing the light flicker which usually occurs when large home air conditioners are turned on. The step starter inserts a resistance in series with the motor for approximately two seconds. After two seconds the timing relay energizes the coil of the contactor, shorting the resistor and applying full voltage to the motor. This reduces the current on the first step and reduces the initial voltage drop. When the resistor is shorted out, a second increase in current starts the motor.

Electrostatic Air Cleaner

CLEANABLE AIR FILTER for furnaces and air conditioners, featuring a filament body of specially woven fibers containing positive and negative electrostatic charges which are said to retain their effectiveness throughout the life of the filter — Microton Corp., Box 2092, Charlotte, N. C. Scientific ragweed pollen tests in a 3 ton air conditioning system showed the electrostatic air filter 99.5 percent efficient in removing pollen from air, according to the manufacturer. Air passing through the intricate weave sets up a turbulence which generates voltage, attracting dust and dirt to their opposite charges. The filter is said to hold these particles permitting clean air to pass. Filter is cleaned by rinsing or hosing with warm water.



Above: Air Filter
Right: Unit Heater

Gas Fired Unit Heaters

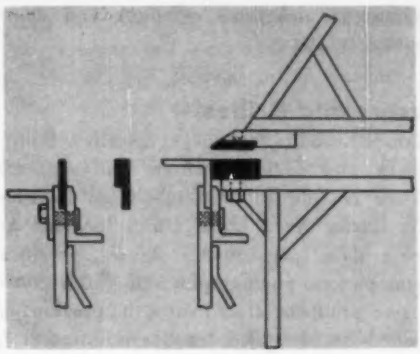
"LUXAIRE" gas fired unit heaters in four sizes — 60,000, 90,000, 115,000 and 170,000 Btu input — C. A. Olsen Manufacturing Co., Filbert St., Elyria, O.

STEINEN
Oil Burner
NOZZLES
with
MIRROR
FINISH
TIP
for Quiet – Uniform – Efficient Combustion
● Mirror Finish Tip causes heat deflection and minimizes gumming and coking.
● All nozzles individually flow-tested.
● Steinen Nozzles assure better all around burner performance.
● Sizes from .50 GPH to 35 GPH—both hollow cone and solid cone spray patterns.
Contact your jobber or write us for additional information
STEINEN
WM. STEINEN MFG. CO.
MANUFACTURERS OF ACCESSORIES FOR OIL HEATING AND AIR CONDITIONING

Encased in restyled heavy gage steel cabinets, the unit heaters feature adjustable louvers, removable welded ribbon-type gas burners, compact heating elements and high velocity fans with rubber-mounted motors.

Hand Brake Inserts

CHANGE IN DESIGN of all models of standard hand brakes and universal box and pan brakes incorporates hard inserts for bending leaf bars and also for the top



nose bar and bottom bar — Dreis & Krump Manufacturing Co., 7404 S. Loomis Blvd., Chicago 36. Said to increase the life of the bending edges, the hard inserts can be removed and replaced with a minimum loss in production time.

Oil Fired Furnace

MODEL U-AC oil fired upright furnace, recently announced, now uses an oil vaporizing burner — H. C. Little Burner Co., Inc., Woodland Ave. and Du Bois St., San Rafael, Calif. The furnace, which has an hourly output rating of 82,000 Btu and is listed for one in. clearance at the back and both sides, is available in gray hammertone enamel finish.

Window Air Conditioners

THREE WINDOW air conditioners comprising the 1955 line feature a new refrigeration circuit which cools and filters air twice and is claimed to decrease temperature in an average room 12 deg in three minutes 15 seconds — Mitchell Manufacturing Co., 2525 N. Clybourn Ave., Chicago. Available in ¾, one, and 1½ hp (Models M-345, M-1005 and M-1245 respectively), the units contain a regulating switch that delivers either a concentrated column of air or a gentle flow. Featured are two-speed motor, automatic thermostat, flush mounting, air direction control, and a new device to simplify installation. Rated power factor is 90 percent in ¾ hp model, 85 percent in one hp model, and 92 percent in the 1½ hp model. The smaller unit operates under the 12 amperes limit set by the National Electric Code, the manufacturer states.

Easy to Install

because it's a complete package

Easy to Sell

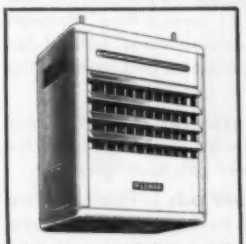
because it's completely enclosed

the Reznor PAC

No exposed controls... no protruding burner... no dangling connections. Everything completely enclosed in a compact appliance-styled cabinet. One look at the Reznor PAC and your prospects will become customers. It's the *only* completely enclosed horizontal furnace.

The same features that make the PAC easy to sell make it easy — and profitable — to install. It comes as a complete package. No outside controls or connections. They're all mounted within the main cabinet. And your job is simplified by the built-in draft diverter and by the ease of conversion from horizontal to vertical flue connections.

Three sizes — 75, 100, and 125,000 BTU. Universal burner for any type of gas. AGA approved for all horizontal furnace applications.



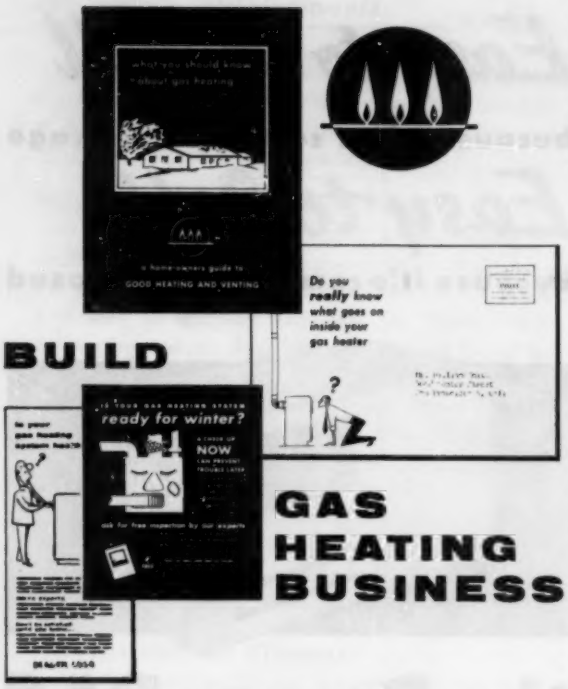
Reznor suspended gas unit heaters are available in nine sizes—25,000 to 250,000 BTU.

Used without ducts, the PAC becomes a deluxe unit heater which meets the most exacting demands for cleanliness, quietness, and fine appearance.

Don't miss your chance to cash in. Write today for your copy of Bulletin GNP-52. **The Reznor Manufacturing Co., 53 Union Sheet, Mercer, Pa.**

REZNOR

THE WORLD'S LARGEST-SELLING GAS UNIT HEATERS



with

METALBESTOS

EYE-OPENERS

as your

DOOR-OPENERS

Now the prestige product in the gas venting field brings to your customers, the home-owners, an informative eye-opening explanation of **what** gas heating is all about . . . **why** their gas heating system should be checked . . . and **who** will perform this service free (answer: their Metalbestos dealer). It's a natural for building gas heating business and here are the tools to do it:

- ***a 16-page illustrated booklet** that convinces the home-owner of the need for a correct, up-to-date gas heating system.*
- ***dealer newspaper ads** to hammer home the importance of having gas heating systems checked.*
- ***dealer mailing pieces** that offer your customers the Metalbestos booklet and your check-up services.*

Contact your nearest Metalbestos jobber today about these door-opening eye-openers — yours without charge — or write to:

METALBESTOS DIVISION
WILLIAM WALLACE COMPANY • BELMONT, CALIF.

new literature . . .

Stainless Steel in Architecture

USES OF STAINLESS steel in architecture and building are discussed in an illustrated, 22 page booklet—Crucible Steel Co. of America, Henry W. Oliver Bldg., P. O. Box 88, Pittsburgh 30. It is pointed out that stainless steel is impervious to weather, resists fire, needs little maintenance and is attractive in appearance. Applications illustrated and described include curtain wall construction, store fronts and entrances, kitchens, residential and farm roofing, chimneys and vents, windows and doors and ornamental tubing.

Diffusers and Grilles

CATALOG LRC-54 (28 pages) describes floor, wall, baseboard and ceiling diffusers and registers and grilles for heating and cooling—Lima Register Co., 651 N. Baxter Ave., Lima, Ohio. Included are engineering data, performance figures, specifications, diffusion pattern photographs and a Btu conversion table. Two products offered since the previous catalog was issued are extended baseboard diffusers for all around heating and cooling in new and old house installations and square, step-down design ceiling type diffusers. Also featured is the "45" wall diffuser, adaptable for use in existing installations where cooling is being added and registers are located in or just above the baseboard.

Heating and Cooling Equipment

CATALOG No. 18 (160 pages) *Everything for the Heating Trade* illustrates and describes equipment, tools, parts and supplies for all types of heating applications—A. R. Webber Co., 424 Howard Ave., New Haven, Conn. Information is also presented on air conditioning, welding and electrical equipment.

Ventilating Equipment

A GUIDE to selection of propeller fan type ventilating equipment is offered in a 36 page catalog (No. 151) —Ilg Electric Ventilating Co., 2850 N. Pulaski Rd., Chicago 41. Specifications and installation data are offered on portable, kitchen, tubeaxial, centrifugal, home cooling, roof ventilator and other types. Case study photographs picture a wide variety of installations.

Vibration Isolators

PRODUCT BULLETIN No. 541, eight pages, describes the features and uses of type 5200 shock and high vibration isolators—The Barry Corp., 1000 Pleasant St., Watertown, Mass. Graphs give data for isolator loads, shock transmissibility, vibration transmissibility and coupled natural frequencies. Also available is

the company's *Product Digest*, a four page illustrated booklet showing all standard isolators including "Leveling Barrymounts" which incorporate mobility features with vibration isolation for metalworking machinery. The *Digest* also lists technical articles on various aspects of shock and vibration which are available to engineers upon request.

Warm Air Ducts and Fittings

SIMPLIFIED PRACTICE Recommendation R207-54 consists of a simplified list of ducts and fittings for warm air heating and air conditioning for gravity, forced air extended plenum and perimeter systems as well as sketches which are intended as an aid to identification of the items listed. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, or from any department field office, for 10 cents a copy. A discount of 25 percent will be allowed on orders of 100 or more copies.

Roof Ventilators and Accessories

CATALOG INSERT shows a line of power and gravity roof ventilators—Penn Ventilator Co., Goodman above Allegheny Ave., Philadelphia 40. Included are technical data and capacity ratings with illustrations of propeller fan, centrifugal, stationary, rotary and ridge roof ventilators and accessory products.

Gas Anaylzers and Alarms

COMBUSTIBLE GAS ANALYZERS and alarms are described in a 20 page brochure (No. 0703-3)—Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8. Actual installations in various industries are described, and a method of designing a combustible gas alarm system is shown schematically.

Sheet Metal Folding Machine

BULLETIN describes the "A. B. Parker" portable sheet metal folding machine for forming all types of boxes, brackets and chassis from sheet metal—Television Accessories Co., Dept. P., Box 6001, Arlington 6, Va.

Multiple Room Air Conditioners

A BROCHURE on air conditioning an entire building with individual packaged units was prepared in answer to requests from building managers seeking more information about individual packaged air conditioners as compared to central systems — Air Conditioning Div., Philco Corp., Tioga and C Sts., Philadelphia 34. The report covers four major points that should be considered by any purchaser of air conditioning for motels, hotels, office or other industrial buildings.

Ingersoll *specializes* in producing heat-resisting stainless steels—of *exceptional forming qualities*—specifically for oil burner combustion chambers.

Whether you use these steels in large or small quantities, Ingersoll facilities offer exceptional service by custom shearing to your own specified combustion chamber blanks, or multiples thereof.

Advantages
OF HEAT-RESISTING STEEL CHAMBERS

- **No breakage in shipment or handling**
- **Lighter weight lowers freight costs**
- **Quicker heating—greater efficiency**

ENGINEERING B-W PRODUCTION

Write, wire or phone for details

Ingersoll STEEL DIVISION
Borg-Warner Corporation
310 S. Michigan Ave., Chicago 4, Illinois
Plant: New Castle, Indiana

new literature *(Continued)*

They are: 1) initial cost; 2) operating cost; 3) special problems relating to installation, operation and maintenance; and 4) performance.

Perimeter Baseboard Diffusers

DATA SHEET covers baseboard diffusers in 2, 3 and 4 ft lengths — Rock Island Register Co., 2435 Fifth Ave., Rock Island, Ill. Features include adaptability to interior decoration, maximum diffusion efficiency, durable construction, and ease of installation. Specification data includes prices, dimensions, capacities and shipping weights.

Gas Fired Heating Equipment

POCKET SIZE BOOKLET contains rules and regulations for the installation, maintenance and use of piping, appliances and fittings for gas — Department of Public Utilities, City of Richmond, Va. Included are rules and regulations applying to central house heating equipment, water heaters, incinerators and gas fired unit heaters.

Aluminum Sheet

BOOKLET presents data on aluminum for use in product design and manufacture — Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland 12, Calif. Included is information on flat and coiled sheet, plates, circles and various types of formed sheet.

Translucent Panels

FOUR PAGE folder contains information on translucent fiber glass panels—Alsynite Co. of America, 4654 De Soto St., San Diego 9, Calif. In addition to showing the company's full range of 20 standard colors, the folder contains complete statistical data, including specifications on all series (flat and corrugated), as well as installation information, weight, strength and other physical data.

Registers and Grilles

ORNAMENTAL grilles designed to conceal radiators in various architectural applications are illustrated and described in bulletin No. 41—Diamond Mfg. Co., 243 W. 8th St., Wyoming, Pa. Also described are steel registers, ceiling outlets, air conditioning registers and grilles and fixed-louver grilles.

Aluminum Insulation

INSTALLATION MANUAL gives instruction for insulating attics against heat and vapor flow—Infra Insulation, Inc., 525 Broadway, New York 12. The brochure explains how and where to install multiple accordion aluminum insulation; where collar beams are installed; where to ventilate for proper heat and vapor circulation; and how to get complete uniform-depth, end-to-end insulating value.

we hear that . . .

A. L. REYNOLDS (left), special project engineer for Williams Heating Equipment Div., Eureka Williams Co., is shown just before boarding the plane which took him to Europe

▸ A. L. REYNOLDS, special project engineer for Williams Heating Equipment Div., Eureka Williams Co., recently flew to Europe for a series of technical discussions with the company's European distributors. He spent three weeks in England, Sweden, Belgium and France, making the entire trip by air.

▸ THE A. O. SMITH CORP. recently prepared a report of its investments in research and manufacture for the gas industry. Referring to the company's new line of gas fired warm air furnaces, which feature modulated heating, the report points out that "this development (modulation in gas fired heating) means that for the first time in domestic automatic heating, continuous heating is possible." The report also points out that the company's latest research is in the direction of a new type of gas fired air conditioning. Several hundred thousand dollars, it notes, has been allocated for this project.

▸ THE KALAMAZOO FURNACE & Appliance Mfg. Co. has purchased the inventory of the Pennant Corp. consisting of 50,000 pieces, all tools and dies and some press equipment. It also has acquired sole patent rights to the registers for warm air furnaces formerly manufactured by the Pennant company.

▸ INLAND STEEL CO. plans an expansion of more than 60 percent in its capacity to produce galvanized steel sheets. A third continuous line for the production of zinc coated sheets will be installed at the Indiana Harbor works. Construction should be completed by the end of 1955, according to Joseph L. Block, president of the company. Mr. Block said galvanizing capacity has been below needs of the middle western area and that the new type sheets produced by the

No lost sales

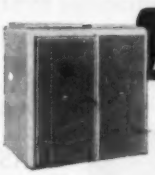
(because you don't have just the right unit for the job)

when you sell CENTURY

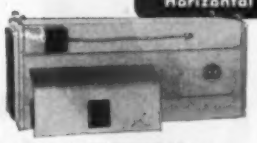
65

Sizes and types
Gas and oil
Heating and cooling

Winter Air Conditioners
Gravity Units
Commercial and Industrial Furnaces
Cooling Units
Counterflow Units
Automatic Air Purifier-Humidifier
Preassembled Models
Horizontal Units
Conversion Gas Burners
Boiler-Burner Units—Oil-fired
Domestic Water Heaters—Oil-fired
Conversion Oil Burners



Century Winter Air Conditioner



New Century Gas-Fired Horizontal

CENTURY ENGINEERING CORP.
Cedar Rapids, Iowa

CENTURY—the complete line with the features that help you outsell your competitors.

GET THE FACTS

Century Engineering Corp.
Cedar Rapids, Iowa AA

Gentlemen: Send me information on your complete gas and oil heating and summer cooling line.

Name

Firm

Address

City State

continuous method are creating new markets for themselves. Fabricators are forming them into many finished products which previously had to be made of uncoated steel and then dipped in hot zinc after they were formed, he said. The projected line is scheduled to have the capacity to produce 80,000 or more tons annually, varying according to the weight and width of the sheets being coated.

▸ THE NATIONAL Association of Home Builders recently held its second annual advanced school for builders. The 10-day intensive training course provides classroom and field instruction in every phase of home building. Engaged to address the air conditioning panel was C. W. Nessell, chairman of the field investigation committee of the National Warm Air Heating and Air Conditioning Association.

▸ TWO YORK CORP. executives, Ray K. Serfass, general sales manager, and J. M. L. Joslin, manager, industrial relations, have recently been named vice presidents of the firm. Mr. Serfass graduated from the company's student training program in 1932 and has been with the firm since that time. Mr. Joslin joined the company in 1948.

INCREASED swine production is attributed to the heat pump recently installed in this hog farrowing barn. Here farm personnel check production records

▸ A WESTINGHOUSE HEAT PUMP is being used to provide both heating and cooling for an Indiana hog farrowing barn. According to the farm manager, swine production has increased greatly since the unit was installed. "Because we can control the barn temperature," he said, "multiple farrowing can be planned and conducted the year around instead of seasonally." Improved health of the swine is also attributed to the heat pump. The pump is installed in the loft of the barn where it occupies no more space than an average size furnace.

Actual tests prove Cincinnati Elbows last longer!

All Cincinnati Elbows are covered with protective zinc because the elbow is hot-dipped *after* formation. Complete galvanizing insures a rust-proof longer life elbow with no trouble-causing leakage.

Cincinnati Elbows, precision made of uniform quality, are guaranteed to fit any size standard pipe. Available in any size, angle and metal, including galvanized steel, stainless steel, copper and aluminum.

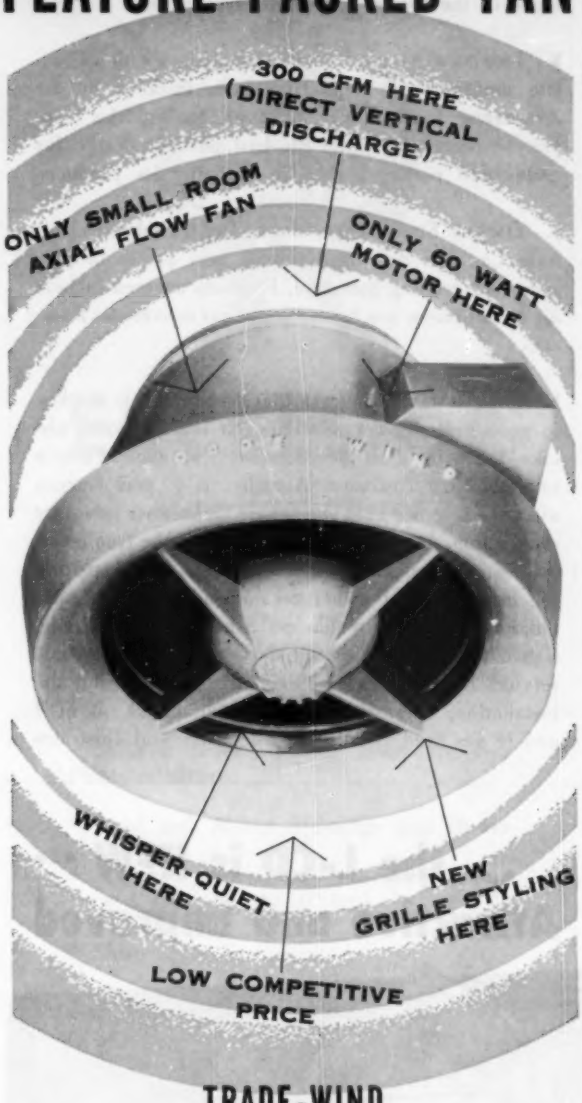
Give your customers the best elbow available.

ASK YOUR JOBBER.

Cincinnati Elbows fit better because they're made better!

CINCINNATI ELBOW CO.
4730 MADISON ROAD, CINCINNATI 27, OHIO

FEATURE-PACKED FAN



TRADE-WIND
AXIAL FLOW VENTILATOR

It's outstanding in every feature! You have never seen a fan like this—less watts—less money—less noise—but with a full 300 CFM performance.

Can be installed in wall or ceiling—requires no elbow for vertical discharge. And the modern high-style grille makes a striking installation in any room.

WRITE FOR COMPLETE INFORMATION

Trade-Wind Motorfans, Inc.

7755 PARAMOUNT BLVD., DEPT. AA RIVERA, CALIFORNIA

More than 2,000 answers on how to sell more heating, ventilating and air conditioning equipment

12TH INTERNATIONAL HEATING & VENTILATING EXPOSITION

Air Conditioning Exposition

COMMERCIAL MUSEUM • PHILADELPHIA

JANUARY 24-28, 1955

That's what you'll find at the 12th International Heating and Ventilating Exposition where over 400 leading manufacturers will demonstrate over 2,000 new and improved products. You'll find answers to problems of conditioning air in commercial, industrial, public and domestic buildings.

PLAN NOW TO ATTEND

Look for your answers from exhibits . . . demonstrations . . . technically staffed personnel . . . product comparisons . . . on-the-spot cost estimates . . . available technical data . . . other time-saving, cost saving ways.

Bring your associates to this source of quick and complete information that will be helpful in the sale and installation of warm air heating and air conditioning equipment.

Under the auspices of the American Society of Heating & Ventilating Eningeers

Write for advance registration

Management: International Exposition Co.
480 Lexington Ave., N. Y. 17, N. Y.

we hear that *(Continued)*

SHEET METAL, heating and air conditioning work is now being handled by the Columbus Roofing and Insulation Co. at its Columbus, Ga. shop

▸ THE COLUMBUS ROOFING and Insulation Co. has recently added a complete metal shop to its building at 1310 Rhodes St., Columbus, Ga., and will now do heating and air conditioning as well as roofing and insulation work. Charley Bush has been named to head the new operation.

▸ CONNOR ENGINEERING CORP. is enlarging its production facilities by a 20,000 sq ft plant addition.

▸ EDGCOMB STEEL AND ALUMINUM CORP. is the new name of the former Edgcomb Steel Corp.

▸ TWO NEW PACKAGE TESTING machines which simulate thousand-mile trips have been installed by the Armstrong Furnace Co. Through testing, the company expects to develop the best possible design for crates and packages used in shipping its products.

▸ TIMKEN SILENT AUTOMATIC DIV., Timken-Detroit Axle Co., has developed several new pieces of consumer advertising literature. Products covered include air conditioners, gas furnaces and gas conversion burners.

▸ THE HEIL CO. believes that post-selling is the key to good dealer-owner relations. "It is a common mistake," says the *Heil Merchandiser,* "to assume that a sale makes a customer. Actually, it is performance after the sale has been made that determines customer satisfaction. And customer satisfaction is the true measure of success in any selling effort." Recognizing the importance of owner recommendation as a sales builder, the company has published 42 manuals designed to insure lasting satisfaction through post-sale service. The manuals give explicit instructions for the installation, operation, and servicing of 24 oil fired and 18 gas fired models. Each describes and illustrates

WALKER
The Original Calibrated
DRAFT REGULATOR

...the L-CD is NEW • •
Attractive and Improved

See for Yourself How It Speeds Replacements and New Installations.

WATCH FOR
THE ANNOUNCEMENT AND FIRST SHOWING
of the most revolutionary improvement (patents pending) since the introduction of automatic draft controls.
First showing at the International Heating and Ventilating Exposition — Philadelphia — January 24-28, 1955.
Booth Number — 405

With ALL These Easy-To-Sell Features!

- **CALIBRATED ADJUSTMENT DIAL** —"tune in" the exact draft needed for any heating system.
- **BAKED ENAMEL FINISH**—on damper plate as long-lasting as it's handsome—appeals to your customers.
- **LONG, HEAVY GAUGE PRE-FORMED COLLAR** — complete, ready for quick time-saving installation.
- **SENSITIVE SEALED PIVOTS** — guaranteed to stay clean and friction-free for a long lifetime of service.

WALKER Manufacturing & Sales Corp., 1730 Penn St., St. Joseph, Mo.

EXCELSIOR

Manufacturer of

★ Galvanized Snaplock Pipe, Elbows, and Angles

★ Gravity and Forced Air Ducts and Fittings for Every Type of Warm Air and Air Conditioning Distribution System.

★ Stainless Steel Chimney Liners for Gas Heat Installations

★ Blued and Walnut Stovepipe and Elbows

★ A.G.A. Approved Gas Diverters (Horizontal and Vertical 3" to 10" Inc.)

★ Sheet Metal Specialties

THE COMPLETE LINE

BOOTH S-65
International Heating and Ventilating Exposition
Philadelphia, Pa.
January 24-28, 1955

Write for Current Catalog 9 B for Details and Prices on Complete Line

THE EXCELSIOR STEEL FURNACE COMPANY
118 S. Clinton St., Franklin 2-8120, Chicago 6, Ill.

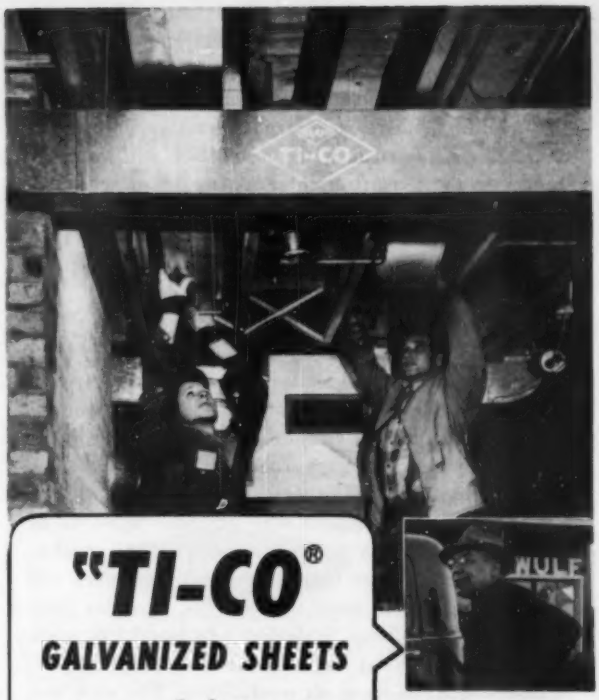
ADI STANDARDIZED FITTINGS

— DIVISIONS —

EXCELSIOR HEATER & SUPPLY DIV.
The Excelsior Steel Furnace Company
879 Hersey Ave., St. Paul 4, Minn.
Telephone: NEster 7255

EXCELSIOR HEATING SUPPLY DIV.
The Excelsior Steel Furnace Company
2 East 3rd Street, Kansas City 5, Mo.
Telephone: Victor 3715

BREX DIV.
The Excelsior Steel Furnace Company
One Industrial Rd., Wood Ridge, N. J.
Telephone: WE 9-2020



"TI-CO® GALVANIZED SHEETS cut my fabrication costs 20 to 25%!"

"Before I started using new Inland Ti-Co galvanized sheets, the biggest profit leak in my shop was wasted fabrication time," says Maurice L. De Wulf, heating contractor of Roselle, Illinois

"Figure for yourself what it costs to form a 10-foot heating duct with a Pittsburgh lock seam. Then if the zinc coating flakes or peels along the seam—*just double the cost!* The job has to be done over, and though you may be able to salvage some of the material, you can't salvage those wasted man-hours."

Mr. DeWulf is just one of many sheet metal men who has found that lost time due to faulty galvanized sheet coatings can be prevented by using Inland Ti-Co . . . developed especially to meet the need for a galvanized sheet that can take the toughest forming without cracking, flaking or peeling of the zinc coat.

NEW INLAND TI-CO GALVANIZED SHEETS . . . galvanized by a patented, continuous process that eliminates the brittle iron-zinc layer which causes ordinary galvanized to crack and peel. *Yet TI-CO costs no more!* Ask your dealer for Inland Ti-Co. Look for this stencil on all your galvanized sheets.

Write Dept. A2 for free descriptive booklet about Ti-Co.

INLAND TI-CO®

INLAND STEEL COMPANY

38 South Dearborn Street • Chicago 3, Illinois

Sales Offices: Chicago • Milwaukee • St. Paul • Davenport
St. Louis • Kansas City • Indianapolis • Detroit • New York

we hear that

(Continued)

procedures for a specific unit and provides for easy ordering of replacement parts, should they be needed. In addition, there are large operating instruction cards to be posted near the installation and warranty and guarantee registration cards for the owner's protection. All of these items represent considerable effort and expense, the company says, but the results they bring can be mutually rewarding to both dealers and their customers.

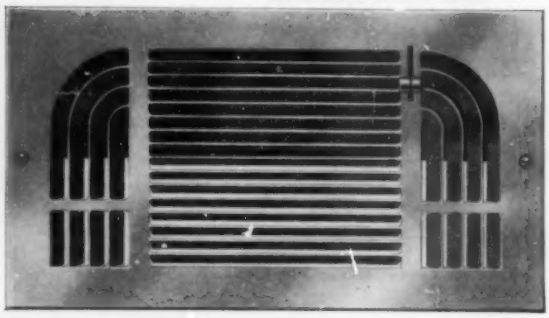
▸ THE MITCHELL MFG. CO.'s "early bird" 1955 spring promotion, designed as a pre-season sales stimulant, offers dealers vacations ranging from a week end at Niagara Falls to a nine day trip to Paris, depending on how many room air conditioners the dealer buys. The all-expense trip to Paris will be awarded to those dealers who purchase upwards of 50 air conditioners before February 1. All dealers who buy six or more conditioners will get a week end trip in addition to other inducements. Five day trips to Nassau are offered to dealers who buy 12 or more units and seven day vacations in Havana go to purchasers of 25 or more air conditioners. The week end trips will be to such places as Las Vegas, Palm Springs, Miami Beach, the Poconos, the White Mountains, Niagara Falls, and the Waldorf-Astoria Hotel in New York City.

THE ANTHRACITE industry's "Anthracade" contains automatic furnace burner units, a live firing cage and special educational displays on heating

▸ A MOBILE HEATING equipment display has been developed by the anthracite industry to show home owners and building operators new types of automatic hard coal heaters. The display will appear at home shows, county fairs and shopping areas, will be manned by local fuel dealers, equipment distributors and industry engineers who will discuss heating problems with visitors and explain how the equipment operates.

Give your heating installations *"eye appeal"* with the new RAINBOW wall diffuser

By popular demand we have developed this new design for use on either high or low velocity perimeter installations



AVAILABLE FOR IMMEDIATE DELIVERY AT NEW LOW LIST PRICE
Order with or without valve for wall, baseboard or out-of-wall installations.

SIZES—10, 12, 14 x 4"
10, 12, 14 x 6"

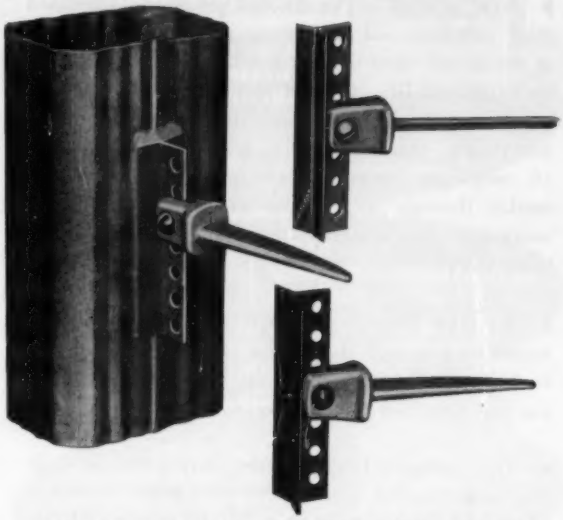
Ask your jobber for complete details and prices or write direct to:

THE A & A REGISTER COMPANY
8327 CLINTON RD. CLEVELAND 9, OHIO

Contractors Prefer F & F

CONDUCTOR FASTENERS

for a Neat, Substantial Job!



These high grade, inexpensive fasteners take less time to put in, make a more secure and permanent installation. Pipe stands ½" away from wall. Cadmium plated malleable iron drive bolts to galvanized or copper perforated clip. Write for details and prices.

FRANCK and FRIC

7109 KINSMAN ROAD · CLEVELAND 4, OHIO

Send for This Valuable Collection of Data

"PANEL WARM AIR HEATING"

51 pages—8½" x 11"—$1.00

Made of numerous papers published originally in "American Artisan," this booklet includes a simple, down-to-earth explanation of panel heating. What this method of heating can and cannot do in providing indoor comfort is unmistakably pointed out. It describes various types of installations, and explains why some operate satisfactorily and others do not. Many practical suggestions on correct design procedure are also given.

To obtain a copy, send $1.00 today to the address below.

KEENEY PUBLISHING COMPANY

6 N. Michigan Avenue **Chicago 2, Ill.**

Save Time...Labor...Material

with BEVERLY metal cutting SHEARS

throatless SHEARS

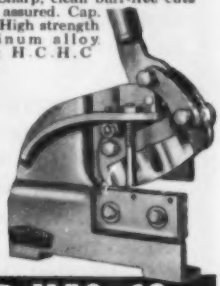
Make any cut—straight, irregular, curved. Exclusive design permits turning work any direction while cutting. 4 models—cap. to 3/16".

Inside SLOTTER

Makes cuts up to 8" inside edge of sheet. Sharp, clean burr-free cuts always assured. Cap. 16 ga. High strength aluminum alloy body; H.C.H.C blades.

slitting SHEAR

New "SS" Series—easier cutting with compounded linkage. 3 models—cap. to 5/32"; trimming capacity to ¼" mild.



See your Beverly Distributor. Write for FREE illustrated Bulletin.

Beverly **SHEAR MFG. CO.**

3020 W. 111th STREET • CHICAGO 43, ILLINOIS

TIME SAVING E-Z-ON DAMPER REGULATORS PERMIT INSTANT ASSEMBLY

(Shown— head piece of #27 E-Z-ON)

It's the little things that make the Big difference!

Advanced design of E-Z-ON damper regulators permits on-the-job Assembly with only a hammer — no drilling — no rivets. This 16 gauge steel regulator is simply positioned on the damper by sliding it over the scribed center line. The E-Z-ON accurately stays in position until a hammer blow drives the sharp prongs through the damper (E-Z-ON prongs will pierce 22 gauge metal.)

E-Z-ONS PROVED MORE PROFITABLE

Job Histories prove that your apprentice or journeyman can save two-thirds of their damper makeup time with E-Z-ONS.

M. A. GERETT Corp.

724 W. Winnebago, Milwaukee, Wis.

Stocked in CANADA by

THERMIDAIRE CORP.

7-9 Cumberland Street, Toronto

STYLE & SIZE

Famous E-Z-ON standard design No. 27

Solid end tail piece, threaded head piece and wing nut — ⅜" bearing.

Superior E-Z-ON "Snap-Tite" Design No. 29

Tail piece with retractable snap end bearing, threaded head piece and wing nut — ⅜" bearing.

we hear that *(Continued)*

▸ SOUTHLAND HEATING, INC. is again publishing its monthly news magazine, *The Southlander*. The company has started a series of classes for foremen and service personnel designed to acquaint them with the principles of operation of air conditioning equipment, installation procedures and servicing techniques.

▸ SERVICE DEALERS may secure newspaper mats for their local advertising from the Pullman Vacuum Cleaner Corp. The mats feature the fuel saving advantages of removing the soot from furnace walls.

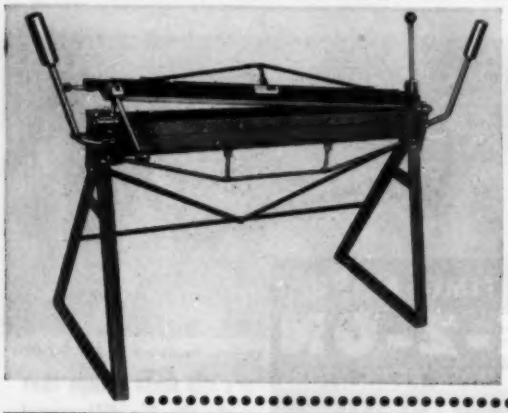
▸ THOMAS B. CHACE and Robert M. Ellis were recently elected directors of the Dole Valve Co. Both of the new directors have served as vice presidents since 1941 and will continue in their respective duties.

▸ THE ROBERTSON HEATING & Supply Co. is currently celebrating its 20th anniversary. Listing some of the milestones in the company's growth, the anniversary issue of the *Robertson Reporter* notes that the first branch was opened at Canton in the early part of 1945 and a few months later the Zanesville branch was established. In 1950 a branch was opened at Youngstown. The following year the Steubenville branch was set up, and in 1954 a new warehouse was opened in Akron. In the 20 years of its history, the company has grown from a two man operation to an organization employing 146 persons.

▸ NEW DEALER organizational programs, increased sales activities and advertising plans were discussed at the recent three day air conditioning meeting held by Frigidaire Div., General Motors Corp., at its Dayton plant. The company plans the largest direct mail advertising campaign it has ever undertaken. New ad campaigns have also been planned to reach the market through such media as national and trade magazines, newspapers, television and radio, and trade shows.

▸ WILLIAM STEINEN MFG. CO. recently held its first supplier meeting of the year at Oil Heat Parts, Rockford, Ill. Servicemen's problems with small field units was the principal topic under discussion.

▸ THE AIRTEMP DIV., Chrysler Corp., celebrated its 20th anniversary with a two day open house November 13 and 14. At the same time, formal opening of two new plant additions took place. The division, originally located in Detroit, moved to Dayton in 1936. It completed a modern plant in 1947, which it has since enlarged extensively to provide for increased production.



WEBCO portable SHEET METAL BENDING BRAKE

in the shop or on the job — a real labor saver . . .

No question about the WEBCO saving you time and money. It's been designed to handle 20 gauge mild steel on a ½" folding arm, easily and with accurate alignment.

You can't beat the WEBCO for duct work and special fabrication. Please write today for the full story!

HALLMOR INC.

McMURRAY ROAD BRIDGEVILLE, PA.

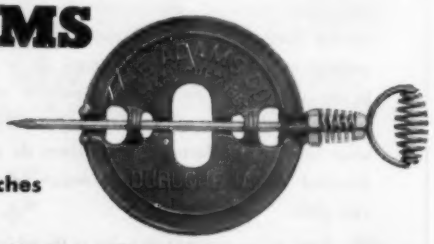
BREMIL

The IMPROVED Compound Lever Shears

ALL-ALLOY No. 2 cuts up to ¼" steel plate.
ALL-ALLOY No. 1 cuts up to No. 11 gauge strip or sheet

BREMIL MANUFACTURING CO.
1020 Holland St. ERIE, PA.

ADAMS



Sizes from 3 to 18 inches

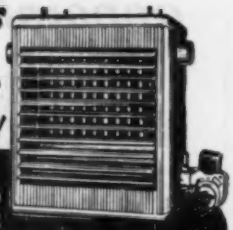
Diamond Smoke Pipe Damper

Buy Adams Known Quality

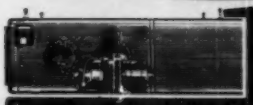
THE ADAMS COMPANY

Bridge Street • Established 1883 • Dubuque, Iowa

3 SPECIFIC SOLUTIONS TO 3 SPECIFIC HEATING PROBLEMS
Only DELTA Makes All 3!

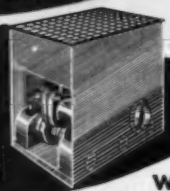


DELTA DIRECT-FIRED OIL UNIT HEATER
For lowest cost industrial heating. Ideal for factories, warehouses, commercial buildings, and locations requiring high velocity air delivery.



DELTA SUSPENDED-HORIZONTAL FURNACE
Especially shallow for narrow crawl spaces and attics. Larger models for offices, partitioned spaces, stores, gas stations.

DELTA GUN-TYPE FLOOR LEVEL FURNACE
Provides an extremely effective, yet extremely economical central heating system for small cellarless homes.



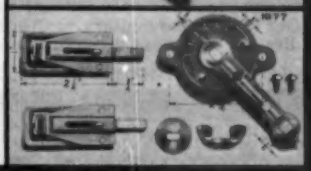
WRITE FOR THE FACTS!

YOU can beat all your competition with this profit-packed trio of fine heating equipment . . . made exclusively and only by DELTA!

DELTA HEATING CORPORATION, TRENTON 8, NEW JERSEY
Representatives in all major cities

H&C *Kwik-way* **DAMPER REGULATOR SETS**

No anvil required. Both bearings have retractable bolts for easier installation. Their convenience and time saving characteristics makes them by far the most economical sets when installed costs are considered. See your jobber or write for literature.



HART & COOLEY MANUFACTURING CO.
360 EIGHTH STREET HOLLAND, MICH.
IN CANADA: HART & COOLEY MFG. CO. FORT ERIE, N., ONTARIO

"CORRECT PRACTICE in OIL HEATING"

NOW AVAILABLE TO YOU!

A complete reprint of the valuable series

by J. J. Mirabile

This practical series covers every angle of oil burner work, including arrangement of shop . . . stocking of parts . . . record-keeping . . . installation procedures . . . the handling of crews . . . how to make heating surveys . . . how to size combustion chamber . . . how to install thermostat . . . how to start the burner . . . how to use testing instruments . . . and how to operate a service department. It contains, as well, a complete list of causes and cures of oil burner troubles that will serve as a reliable guide in making service calls.

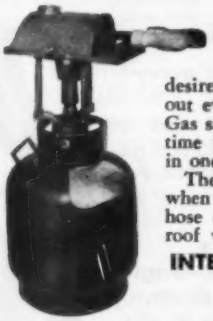
Every shop handling oil burner jobs should own this book. Full size, 8½ by 11 inches — 57 pages of practical helps. Send $1.00 for a copy to the address below.

KEENEY PUBLISHING COMPANY

6 No. Michigan Avenue **Chicago 2, Ill.**

INSTANT LIGHTING **Insto-Gas**
T. M. REG. U. S. PAT. OFF.

SOLDERING IRON HEATER



Sheet metal contractors can now have hot soldering irons in 2 minutes and with Insto-Gas they can be kept at the desired temperature all day long without even looking at the heater. Insto-Gas saves 40% on fuel cost and enough time to pay for the entire equipment in one week's operation.

The Insto-Gas soldering iron heater when attached to the cylinder by 50-ft hose can be operated on a scaffold or roof without moving the cylinder.

INTERNALLY FIRED SOLDERING IRONS

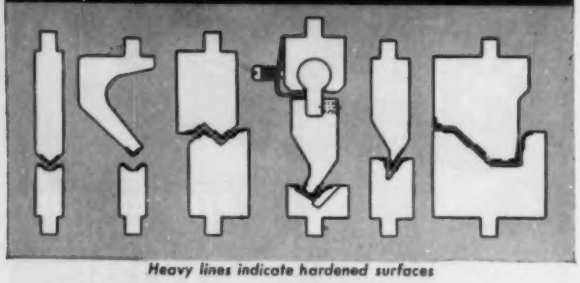
These Insto-Gas soldering irons are designed for continuous operation with no stopping to change irons. Made in two sizes; the No 1-S (2) for fine work and the No 2-S (5) for heavy soldering.

Listed by Underwriters Laboratories and Factory Mutuals Laboratories

Write For Free Folder

INSTO-GAS CORPORATION
DETROIT 7, MICHIGAN
ASK FOR NEW FOLDER ON INSTO-HOT SALAMANDERS

CHICAGO INDUCTION HARDENED PRESS BRAKE DIES



Heavy lines indicate hardened surfaces

for greater die life—
at no extra cost—
on any make press brake

Whether it is a simple die for angle bending or the more complex dies for any of the combined bending and forming operations, CHICAGO induction-hardened dies offer bonus performance at no extra cost. Field reports on these dies show better than ten times the useful life of the conventional dies used in press brakes. Get the full particulars on CHICAGO induction-hardened dies for your next press brake job.

Steel Bending Brakes For Over Fifty Years 4901

DREIS & KRUMP MANUFACTURING COMPANY — CHICAGO

7404 S. Loomis Blvd., Chicago 36, Ill.

Ask Your Jobber
for
DIECKMANN
ELBOWS
and
SHOES

Plain Round

"An angle for every obstacle"

Made in 28, 26 and 24 gauge steel, hot dipped galvanized after formation. Also in Copper, Aluminum and Stainless Steel.

• • •

Sizes 1" to 6"—Angles 10 to 90 degrees.
Always uniform in size and angle

Round Corrugated

• • •

One piece tapered with no protruding seams—a perfect and tight fit with any conductor pipe without soldering.

Square Corrugated Style "A"

• • •

THE FERDINAND DIECKMAN CO.
P.O. STATION B,
CINCINNATI 22, OHIO

Square Corrugated Style "B"

appointments . . .

▸ C. D. D'AMICO as manager of sales for the Los Angeles plant of Joseph T. Ryerson & Son, Inc. Mr. D'Amico, formerly manager of the Los Angeles stainless steel department, succeeds C. H. Hallett, who has been transferred to Chicago. Succeeding Mr. D'Amico as manager of the stainless steel department is F. X. Kinzie. Melvin B. Monson has been

Melvin B. Monson

C. D. D'Amico

F. X. Kinzie

appointed manager of the company's Milwaukee plant to fill the vacancy created by the retirement of Fred Kurfess. Mr. Monson, with the firm since 1934, has served as manager of the Chicago work order department and until his recent promotion, as assistant manager of the Milwaukee plant.

▸ LUTHER B. SOVDE as district sales manager for the state of New York (excluding the New York City area) for Research Products Corp. Mr. Sovde has a background of many years in merchandising and advertising, and has spent the past year in the home office in Madison. He will make his headquarters in Rochester.

Luther B. Sovde

William J. Donovan

▸ WILLIAM J. DONOVAN, West Hartford, Conn., as New England sales representative for the Kramer Trenton Co.

▸ FRANCIS R. VANLANDINGHAM as field sales representative for the Air Conditioning Div., General Electric Co. Mr. Vanlandingham will handle heating and cooling products in the division's southeastern region. Leland D. Krape has been named field sales representative covering the division's south central region. Vernon Hagmann will handle the sale of heat pumps

THE RIGHT SHEAR FOR ANY CUTTING JOB

MARSHALLTOWN

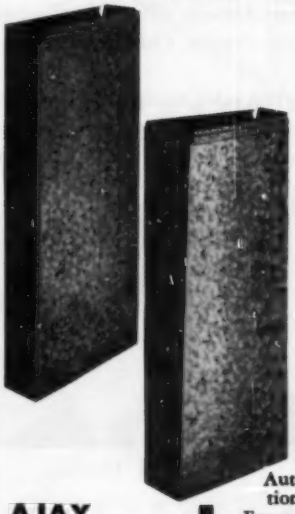
ROTARY
THROATLESS
SHEARS

CUTS ALL SHAPES—SIZES
- QUICKER
- EASIER
- FASTER

Here's a shear that's right for every job. Speedy — efficient. Cuts up to 1/4 inch stock — speed to 6 ft. per minute. Excellent for irregular cutting or straight splitting. Available in hand operated or motorized models. Prompt shipment. Send today for special illustrated bulletin.

MARSHALLTOWN MANUFACTURING COMPANY
Marshalltown, Iowa

ALL YOUR NEEDS In DUCTS and FITTINGS



AJAX

- Highest Quality
- Precision Made
- Quick Assembly
- Forced Air or Gravity
- All Systems

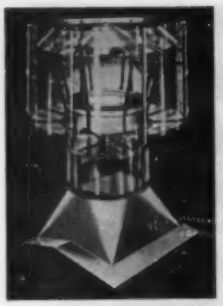
Fittings, Pipe and Duct are die cut and formed, fit up tight and fast with AJAX Automatic Snap Lock connections.

For extra profits, use AJAX Pipe and Fittings to save you installation time and labor.

WRITE TODAY
New complete line catalog complete with helpful data.

AJAX FURNACE FITTING CO.
216-20 E. Front St.
Cincinnati 2, Ohio

DIVISION OF
THE CINCINNATI SHEET METAL & ROOFING COMPANY



Get Two-Way Performance with BURT Free-Flow Fan Ventilators

1 — GRAVITY for Normal Usage

2—POWER When Needed to Exhaust Up To Six Times Faster

The Burt Free-Flow Fan Ventilator supplies efficient ventilation for many production activities by gravity alone. But when production creates high temperatures or increased fumes, dust, etc., its Axial Flow Airfoil Fan speeds up the exhaust as much as six times faster. Adequate ventilation is assured always — the degree is controllable. Sizes from 12" to 84" provide capacities from 1040 C.F.M. to 99,050 C.F.M. See Sweets for details or write for Bulletin SPV-10A.

FAN & GRAVITY VENTILATORS - LOUVERS - SHEET METAL SPECIALTIES

The Burt Manufacturing Company
38 E. South St. • Akron 11, Ohio
Member Power Fan Manufacturers Ass'n.

✓ FEWER EMERGENCY CALLS FOR YOU

RENEW FILTER Signal warns in advance of furnace troubles developing from dirt-clogged air filters—eliminates the most common cause of service complaints.

✓ BETTER HEATING FOR YOUR CUSTOMERS

RENEW FILTER Signal tells when it's time to replace dirty filters—guarantees clean, comfortable heat at all times; worthwhile savings on fuel and cleaning bills; protection against furnace damage.

Bacharach FILTER GAUGE

Fits all types of heating and cooling units.

Accurately adjustable for any kind of replaceable or washable filter.

Easy to install. Drill 4 holes and mount—no connection across filter—no electrical connections.

Suggested Retail Price, $6.35 plus installation charge.

CLIP YOUR INDEX OR WRITE FOR LEAFLET FG-4a

BACHARACH INDUSTRIAL INSTRUMENT CO.
FG-4a 7301 PENN AVENUE • PITTSBURGH 8, PA.

FLANGES THE DUCT
with Amazing Speed!
Less than 5 seconds on short and lighter pieces . . .
Slightly longer on bulkier pieces

MAKES PERFECT DRIVE-CLEATS TOO!

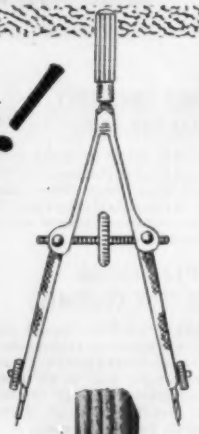
The ONLY tool that does both. A complete drive cleating tool . . . no set-up time . . . no adjustments. Handy to take out to the job when not needed in the shop. Turns idle time into production time. Flanges any square duct up to 20 gauge. Quickly pays for itself in time, material and labor savings.

No. 12 Smith's Cleat Bender (12" wide) . . $46.20*
No. 18 Smith's Cleat Bender (18" wide) . . $72.60*
*F.O.B. Waukegan, Illinois Prices subject to change without notice

PERFECT DRIVE CLEATS fit the duct without the use of a screwdriver.
TREMENDOUS SAVINGS in erection time and labor.

R. E. SMITH
1124 Elizabeth Avenue • Waukegan, Illinois

Precisely!
GALVAN ELBOWS



• Precisely mechanically produced!
• Precisely hot dip galvanized!
• Precisely packed for shipment!
• And, every single elbow GUARANTEED to fit precisely!

Sold Only Through Legitimate Jobbers

Write for our inspiring monthly publication "Galvan Rite-Angle"
• It's FREE on request

GALVAN Manufacturing Co.
New Albany Indiana

appointments *(Continued)*

in the division's central region. Cupp, Inc., Fort Wayne, Ind., has been named a retailer-wholesaler of "Weathertron" heat pumps in the Fort Wayne area.

▸ W. H. Anderson as assistant general sales manager for the Frigidaire Div., General Motors Corp. In his new position, Mr. Anderson will assume responsibility for the division's sales activities on a national basis as assistant to H. F. Lehman, general sales manager.

R. L. DeMarse

L. W. Smith

W. H. Anderson

L. W. Smith, formerly Dayton sales branch manager, has been appointed air conditioning sales manager. Succeeding Mr. Smith as manager of the Dayton branch is R. L. De Marse, formerly administrative assistant to the division's general manager.

▸ James A. Benge as sales manager for the Texas Div., Anchor Post Products, Inc. Mr. Benge will make his headquarters in Houston. C. W. Hudson, formerly sales manager of the Texas Div., has been named branch manager of the New Orleans office. Charles Randolph Roebuck has been appointed branch manager of the company's San Antonio office. Mr. Roebuck was previously with the Corpus Christi office.

▸ D. B. Jones as district sales manager for Mitchell Mfg. Co., in charge of sales of room air conditioners in southern New Jersey, eastern and central Pennsyl-

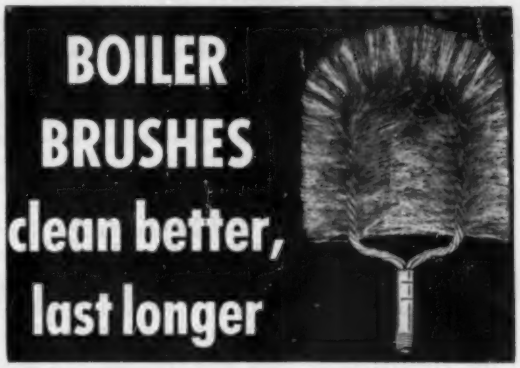
D. B. Jones

J. H. Davidson

vania, Maryland and Washington, D. C. J. H. Davidson has been named district manager of the New York, New Jersey and Connecticut area.

▸ Henry L. Woods, Jr., former assistant to the president of Armco Steel Corp., as director of sales

SCHAEFER



SCHAEFER DOUBLE STEM HORSE SHOE STYLE

One of many Schaefer Furnace Brush Designs, the Double Stem Brush promises a long lifetime of cleaning efficiency. Special "Silver Brite" Rustproof Wire withstands moisture, steam, cellar dampness, stays bright and stiff many times longer than ordinary brushes. Available in several sizes. Write for special prices and complete Schaefer Flue and Furnace Brush Catalog No. 650.

LOOK for the trademark SCHAEFER BRUSHES —MILWAUKEE—

SCHAEFER BRUSH MFG. CO.
117 W. WALKER STREET • MILWAUKEE 4, WIS.

BUY SCHAEFER ...IT'S SAFER

quickdraft

DRAFT CREATOR

A dream come true for the heating installations formerly considered "sick." Positively stops chattering and pulsation (oil), condensation (gas), puffing and sooting (coal). Doesn't obstruct the smoke pipe, can be vented through walls or short stacks.

Get all the facts. Ask your jobber—or write us for name of Quickdraft jobber nearest you.

QUICKDRAFT COMPANY
Dept. A, 1150 So. Erie Blvd., Hamilton, Ohio

Save time and effort with expertly rolled Angle Rings that FIT Accurately on the job. Back them up together and you'll find each is a true circle with a 90 angle.

We roll rings to specification including tees, rounds, flats, channels, tubes and special shapes with or without rivet holes.
Used for many purposes such as reinforcing tanks, joining pipe or smoke stacks, and installing air conditioning fans. Write for our list of standard sizes and discounts — also our circular illustrating our fabricating services.

Phone BIshop 7-4255

NATIONAL METAL FABRICATORS
2140 So. Sawyer Ave. Chicago 23, Ill.

W. A. WHITNEY LEVER PUNCHES
FOR EVERY SHOP AND TOOL BOX

Also supplied with three punches and three dies in a cardboard carton

No. 4B Punch
All parts drop-forged.
Most sturdy punch built for size.
Capacity — ¼" hole through 16 gauge metal
Length — 8½" Depth of throat — 2"
Weight — 3 lbs. Stock size punches 1/16 to 9/32" by 64ths.

Write for catalog — then contact your jobber.

W. A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

The MODERN Lighter Tube

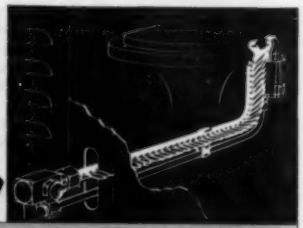
With the Slanting Blue Flame

Today's Great Contribution to Gas Appliance Safety and Dependability!

To safeguard all users of gas-fired heating equipment and appliances against hazardous lighting methods, more and more manufacturers are engineering the MODERN Lighter Tube into their units. Utilities and wholesalers too, strongly favor the MODERN Lighter Tube as a component part of all gas-fired units. Dealers recognize it as a vital sales feature. Available in aluminum or stainless steel ⅜ O.D. tubing.

The MODERN Lighter Tube offers the utmost in . . . .

★ SAFETY
★ DEPENDABILITY
★ SIMPLICITY
★ CONVENIENCE

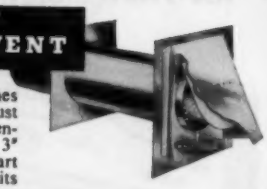


PERFECTED OUTSIDE LIGHTING

MM CO.

MODERN MATERIALS CO.
NORTHVILLE MICHIGAN

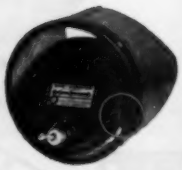
The Original
LAUND-R-VENT



For automatic clothes dryers. Friction free. Rust and ice proof. Built entirely of aluminum. 3" and 4" sizes. Prices start at $1.95. Complete kits available.

Best Performance
New Low Prices

Standard Round
DRAFT KOREKTOR



MODEL 909

Low priced gate control for oil burners and stokers. Exclusive friction-free knife edge bearings. Stock sizes 7" to 12". Also available 4" to 6" sizes for stove and space heaters. Prices start at $1.83 for 7" size.

COLE-SEWELL ENGINEERING CO.
2288 UNIVERSITY AVE., ST. PAUL 14, MINN.

appointments *(Continued)*

planning for the company. Mr. Woods, who has been with the firm since 1926, has had extensive experience in sales work both at the general offices and in several regional offices. Appointed to handle the distribution of stainless steel sheets, strip and plates in the Los Angeles area is the Cold Metal Products Co. of California, Los Angeles.

▸ ROBERT KEENE as advertising and sales promotion manager for the Delavan Mfg. Co. In his new position, Mr. Keene will be responsible for the company's business paper advertising, direct mail program and convention exhibits and will also handle the preparation of sales aids, catalogs and service manuals.

Robert Keene

John C. Atkins

▸ JOHN C. ATKINS as northern California sales manager for the Pioneer Water Heater Corp. Mr. Atkins, who joined the firm in 1952 as a salesman, will have charge of sales in California north of Santa Barbara and east to Reno, Nev. His headquarters are at 631 E. Eighth St., Oakland.

▸ MORRIS CHAPMAN as sales representative in New England for the Windmaster Corp., handling the sale of draft controls.

▸ JACK THOMAS DAVIS as sales representative for Union Asbestos & Rubber Co., handling the sale of "Unarco" air conditioning equipment in southeastern Texas.

▸ THE PHILLIPS-MOORE EQUIPMENT CO., 704 E. Yandell Blvd., El Paso, Tex., as representative for the Kennard Corp. in New Mexico and part of southwestern Texas.

▸ BEN D. WALLER as representative for Wm. Steinen Mfg. Co. in the states of Alabama, Georgia and South Carolina. The states of Oregon, Washington, Idaho and Montana and the provinces of British Columbia and Alberta will be covered by the Howard A. Weller Co. Frank Harbin will represent the company in Maryland, Virginia, North Carolina and part of Delaware. B. L. Rushton, Inc., will handle western Penn-

"WA-TROL"

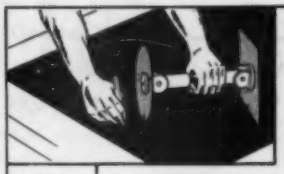
THE IMPROVED AIR-FLOW REGULATOR

• The Wa-Trol damper control is simple to install; makes damper adjustment easy. Made of ivory colored Styrene, Wa-Trols do not fade, rust or peel; and they are impervious to temperature and humidity. No tools are required to make damper adjustment — just a push and turn hand motion; reduces installation balancing time as much as half. • Ask your wholesaler for Wa-Trols.

THERMAL AGENCY

National Sales Agents

THERMAL BLDG. • 1515 DALLAS • HOUSTON, TEXAS



Order this time saver today

JET PATTERN DEVELOPER

ONLY $69.50

COMPLETE WITH 30 TEMPLATES

LAYOUT ANY PATTERN COMPLETE IN MINUTES.

ATTACH TEMPLATES, ADJUST FOR PITCH OR OFFSET AND ROLL OUT PATTERN.

H. OWENS COMPANY

9300 Venice Blvd., Culver City, California

Added Income, Bigger Profits, The Easy Super Red Streak Way

Clean all kinds of heating plants faster and easier with a Super Red Streak Model SH Furnace Cleaner. Helps sell repairs, new plants. Both wet and dry pick-up. Cleans chimneys from basement. Special non-clog filter bag for oil plants.

Ask your wholesaler. Write for free Super Sales Plan Book.

Super Red Streak Model SH—Approved by Underwriters' Laboratories and Canadian Standards.

NATIONAL SUPER SERVICE CO., INC.

1944 N. 13th St. Toledo 2, Ohio

Sales and Service in Principal Cities.

In Canada: Plant Maintenance Equipment Co. Toronto, Montreal, Vancouver

SUPER SUCTION

SINCE 1911 ®

"THE DRAFT HORSE OF POWER SUCTION CLEANERS"

DIAMOND TRADE MARK **GRILLES**

Look Better — Last Longer

Superior workmanship and finish in heavy-gauge metal assures installations of lasting beauty. Most designs stamped in any thickness, up to one-fourth inch, from any metal. Catalog No. 36 illustrates all designs and gives complete working data. Free on request.

Diamond Manufacturing Co.

Box 34 Wyoming, Pa.

Sales representatives in all principal cities

SAMPLES FREE

SODER STAINLESS STEEL RAPIDLY

FLUXES

SODERING

BRAZING & WELDING

L. B. ALLEN CO. INC. Chicago 31, Ill.

ORNAMENTS

STAMPINGS & SPINNINGS

Zinc Ornaments Available From Stock. Copper, brass, bronze, aluminum and stainless steel ornaments made up promptly.

If you don't have catalog K, send for it NOW.

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89 ADAMS STREET BROOKLYN, N. Y.

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Tell Us AT ONCE!

A new postal regulation relating to the handling of undelivered mail may result in some issues of *American Artisan* being thrown away instead of being returned to us — as they have been in the past — for remailing to your new or correct address.

To avoid missing any issue of *American Artisan* it is more important than ever to report both your new and old address to us and your post office. Deadline is the 18th of the preceding month for the next issue. Send changes — and new local postal delivery zone — to

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6 N. Michigan Ave., CHICAGO 2, ILL.

REPAIR PARTS FOR

STOVES, OIL STOVES, FURNACES AND BOILERS . . . . REPAIR SERVICE ON A.P. CONTROLS

—— Distributors of ——

HEATING & AIR CONDITIONING SUPPLIES

Asbestos Paper - Pipe Covering - Duct Insulation

INSULATION FOR ALL NEEDS

A. G. BRAUER SUPPLY CO.

THE COMPLETE HEATING SUPPLY HOUSE

2100 WASHINGTON AVE. ST. LOUIS 3, MO.

appointments *(Continued)*

sylvania and the state of West Virginia. Imperial Refractories will cover all of Canada except the provinces of British Columbia and Alberta.

▸ LEE W. RASCH, formerly president of Rasch Mfg. Co., as manager of the Temco, Inc. central heating division.

Lee W. Rasch

Leonard R. Sparrold

▸ LEONARD R. SPARROLD as test engineer on the product development and research staff of Maxitrol Co.

▸ WALTER R. FRESNE as sales representative in the Idaho-Utah area for the Janitrol Div., Surface Combustion Corp.

▸ J. W. CHERRY CO., 150 Olive St., Shreveport, as sales representatives in northern Louisiana and eastern Texas for DeBothezat Fans Div., American Machine and Metals, Inc.

▸ NATIONAL AIRCO CO., INC., 15 E. 21st St., Baltimore, as air conditioning distributor covering seven counties in northern Maryland for Servel, Inc.

Obituaries

Maurice H. Klett

MAURICE H. KLETT, vice president, the C. A. Olsen Mfg. Co. and the Henry Furnace Co., died suddenly November 14 in a Denver hospital, following a heart attack suffered while en route to Chicago. Mr. Klett, who had served as western sales manager for both firms, was elected vice president in 1952.

Anthony A. Elenbaas

ANTHONY A. ELENBAAS, field representative for Dowagiac Steel Furnace Co., died October 27. He had been with the company five months. Previously he had been district manager for the Holland Furnace Co. for 18 years, and more recently had served 18 years as general manager of the Home Furnace Co.

NEW CONNECTICUT Model U322

UNIVERSAL BENCH BRAKE

quality
economy
versatility

Only $148.50

A quality tool, strong, accurate and easy to operate. • For economical light production, box and pan work, short runs and odd jobs. • Portable, too, for on-job setup! • Replaceable bronze bushings give longer machine life—easy adjustments allow convenient operation. Write for details on the Model U322 and complete line of accessories. Bulletin U322

Rated Capacity: 3/16 flange on 22 gage mild steel, full 3 ft. length. Fingers of case hardened steel in widths of 2, 3 and 4 inches permit 3 inch box and pan depth.

DESIGNERS & BUILDERS OF QUALITY SHEET METAL WORKING EQUIPMENT

W. WHITNEY STUECK, INC.
Old Saybrook, Conn.

Classified Advertising

Rates for classified advertising are 12 cents for each word, including heading and address. One inch $6.00. Count nine words for keyed address. Minimum $2.00.

situation open . . .

SALESMAN WANTED — If you have been successful selling heating equipment to dealers and are looking for an outstanding opportunity — look at this — TERRITORY: State of Wisconsin. PRODUCT: Complete line Warm Air Heating and Air Conditioning products. EARNINGS: Excellent — Salary or Commission and Bonus. TRANSPORTATION: Car furnished. COMPANY: Long established furnace manufacturer. YOUR JOB: To start January 3, 1955, selling complete line to dealers. NOW WHAT: Write today giving outline of your qualifications. Include snapshot — we'll return it. ADDRESS Key 978, American ARTISAN, 6 North Michigan Avenue, Chicago 2, Ill. P.S. Our salesmen know of this advertisement.

SALESMEN: Salary and commissions, car furnished, company insurance, to sell the new line of Rybolt furnaces, coal, oil and gas, packaged Summer Air Conditioners, incinerators and several new items to be introduced early Spring. Call or write Rybolt Heater Co., Ashland, Ohio.

Classified Advertising

Rates for classified advertising are 12 cents for each word, including heading and address. One inch $6.00. Count nine words for keyed address. Minimum $2.00.

situations open . . .

OPPORTUNITY OF A LIFETIME

For a Successful Salesman in the Home Heating and Cooling Equipment Field.

If you are at present a successful salesman or sales management executive in the home heating and cooling industry but must look elsewhere for promotion and higher income, we have an unusual opportunity for the right man between the ages of 35 and 45, to build a future with this long established, progressive, triple A, national organization. High school education necessary. We will provide intensive training in our company school. Adequate salary with expenses, plus incentive income. Give details of your experience. Our salesmen know of this ad. Address Key 976, American Artisan, 6 North Michigan Avenue, Chicago 2, Illinois.

DETAILER—DRAFTSMAN—For layout and development of sheet metal, steel plate and structural work. Must have some knowledge of triangulation and pattern development. Steady work guaranteed. Shop currently working 45-50 hours. Fully paid insurance plan, Blue Cross and Blue Shield, paid holidays, paid vacations. Application should clearly outline, experience, education, age, family status, availability date and salary expected. THE KIRK & BLUM MANUFACTURING CO., 3120 Fo[illegible]r St. (South St.), Oakley, Cinti. 9, Ohio.

WANTED: By large reputable wholesale plumbing and heating firm in Central Illinois. Experienced Furnace and Air Conditioning Salesman and Executive. Good opportunity for competent man. Address Key 979, American Artisan, 6 North Michigan Avenue, Chicago 2, Ill.

agent wanted . . .

MANUFACTURER'S AGENT WANTED—Manufacturer's Agent to represent well known manufacturer. Several choice territories available on exclusive basis. Manufacturer has complete line of approved residential gas and oil furnaces, competitively priced. Address Key 977, American Artisan, 6 North Michigan Avenue, Chicago 2, Ill.

MANUFACTURERS REPRESENTATIVES: Salary and commissions, car furnished, company insurance, to sell the new line of Rybolt furnaces, coal, oil and gas, packaged Summer Air Conditioners, Incinerators and several new items to be introduced early Spring. Call or write Rybolt Heater Co., Ashland, Ohio.

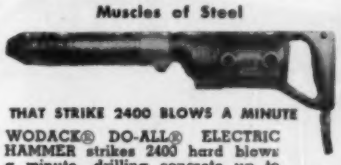
machinery wanted . . .

WANTED TO BUY — New or used Standing "S" Cleat Rolling Machine. Write Lee Wagener Company, 701-5 North Perry Avenue, Peoria 3, Illinois.

SERVICE SECTION

Rates for display space in the Service Section are $12.00 per inch per insertion. One-inch minimum space accepted. Closing date — twentieth of the month preceding issue.

Muscles of Steel



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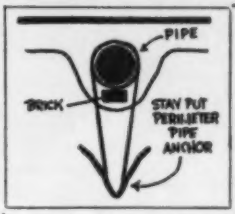

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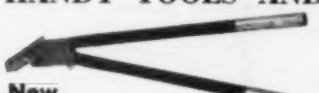

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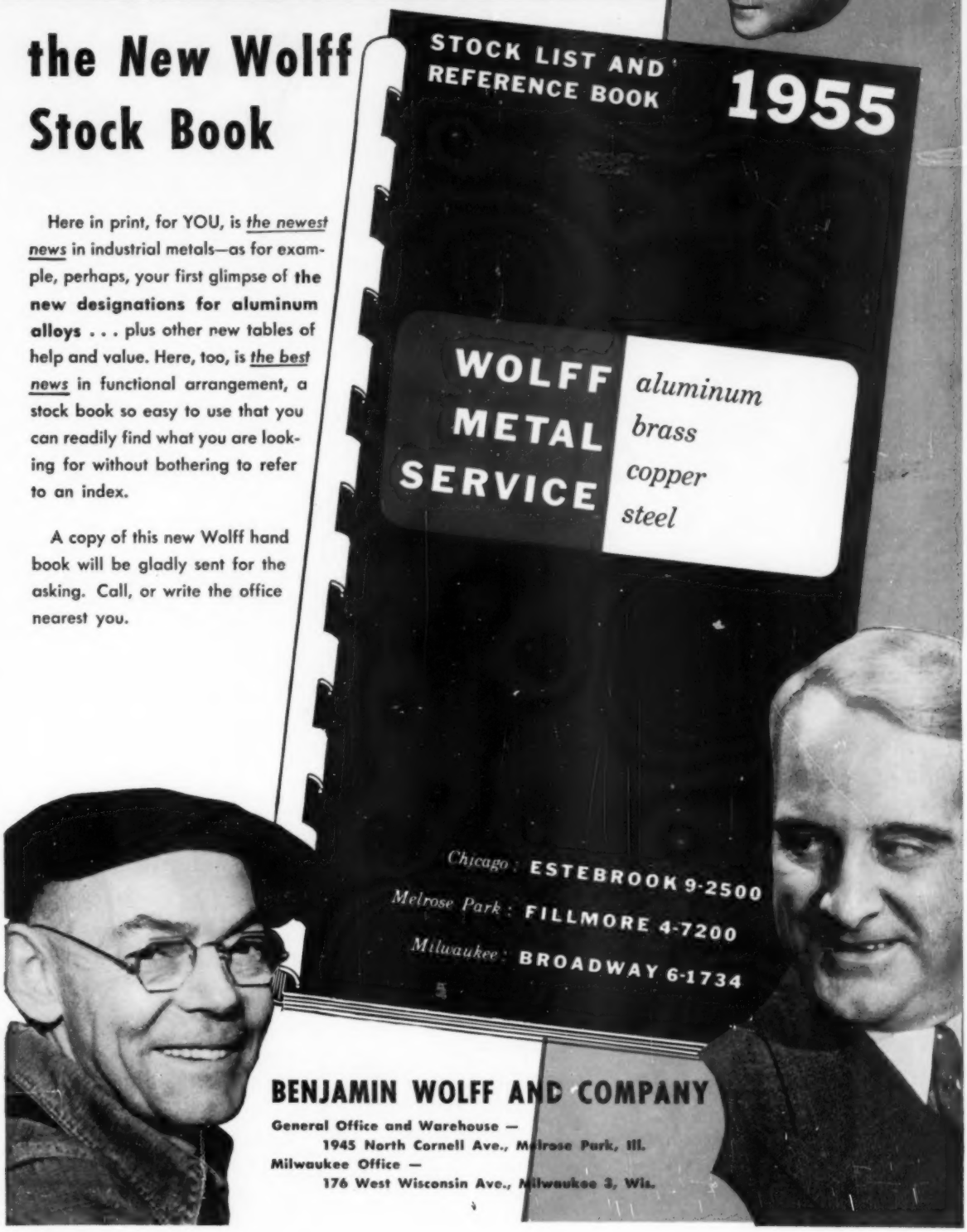

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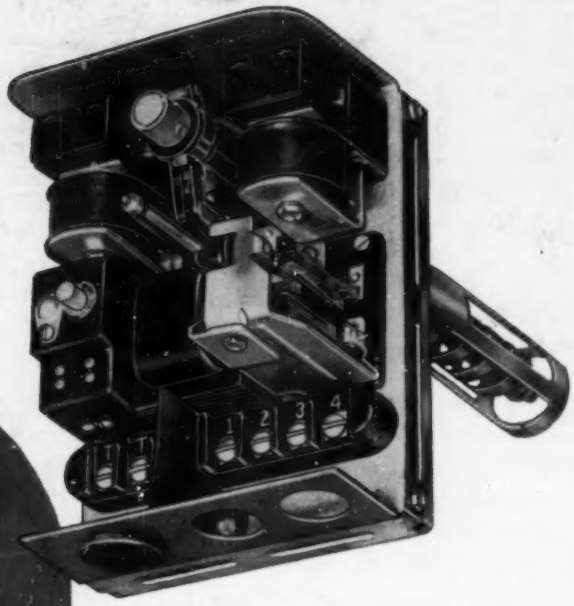

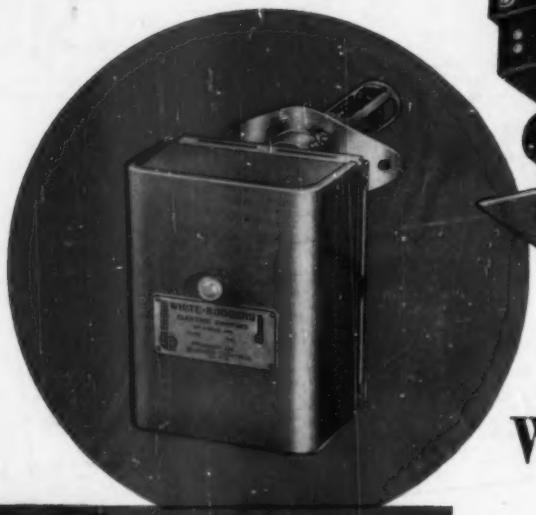

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